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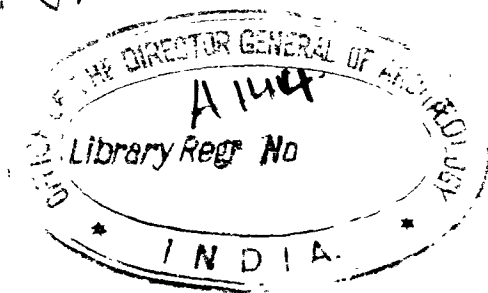
THE MUSEUM JOURNAL

Volume XXII

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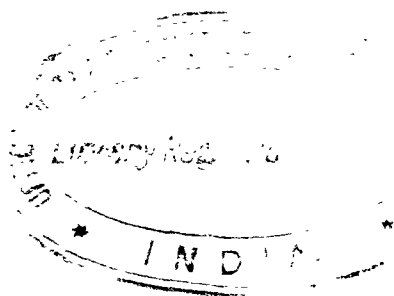
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PHILADELPHIA

FOREWORD

In presenting the following account of the work of the Eckley B. Coxe, Jr., Expedition of the University Museum at the Pyramid site of Meydûm, only a portion of the accomplishments of the 1929-30 season are described. Other considerable excavations were conducted in connection with the large Mastabah, called Number Seventeen, lying at the northeast corner of the Pyramid, as well as in uncovering a large number of tombs in the area surrounding the Pyramid. It has been felt, however, that the publication of the results of both these phases of the work had best be postponed until material gathered by further research is assembled. It is expected that a complete account of these aspects of the Coxe Expedition's work will appear in due course in these pages.

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BY ALAN ROWE

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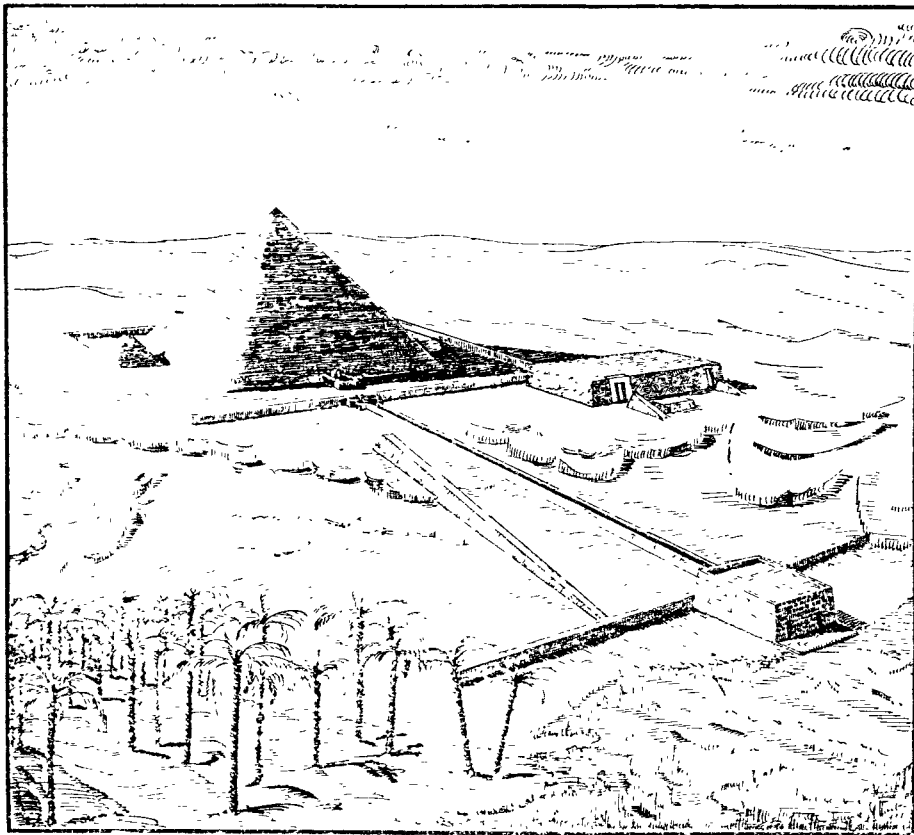


PLATE I.—Reconstruction of the Meydûm Pyramid Site.

THE ECKLEY B. COXE, JR., EXPEDITION EXCAVATIONS AT MEYDÛM, 1929-30

BY ALAN ROWE

I. INTRODUCTION

THE excavations carried out at Meydûm by the Coxe Expedition of the University Museum were begun on November 2, 1929, and closed on April 30, 1930, a season of nearly six months. During this period my staff consisted of Dr. I. Ben-Dor, chief assistant; Messrs. C. N. Johns and R. W. Hamilton, archæological assistants; Mr. R. Franks, Jr., and Fadil Effendi Saba, photographers; Mrs. Rowe, recorder of antiquities; Mr. C. Kent, draughtsman; and Mr. P. Beidler and Ahmed Effendi Abd el-Aziz, architects and surveyors. The three last, together with Mr. I. Reich, drew the plates for this work. Some months prior to November, Mr. Franks also carried out research work in the libraries in Cairo in connection with bibliographical material of the Meydûm site which the Expedition was collecting. It gives me much pleasure to be able to place on record that the loyal coöperation and assistance of the staff enabled me to bring the work of the season to a successful conclusion.

My thanks are due the authorities of the Cairo Museum, especially M. P. Lacau, Director General, Mr. R. Engelbach, and Mr. Battiscombe Gunn (whose assistance in connection with the translations will be referred to elsewhere), for information in various directions; to Professor Sir William Flinders Petrie for allowing us to publish material from many of his maps; to Dr. L. Borchardt for permission to reproduce some of the drawings in his *Entstehung der Pyramide*; to M. Černý for supplying the dates of various hieroglyphic graffiti in the pyramid and pyramid temple; and to Mr. W. Hayes, Director of the Cadastral Survey of Egypt, for kindly instructing his department to make an extensive survey of our site. We have made much use of the publications of our predecessors at Meydûm, particularly those of Lepsius, Mariette, Maspero, Petrie, and Borchardt, the works of the two last, in particular, being monuments of careful and painstaking labour. Our indebtedness to the works of other authorities, especially Dr. J. H. Breasted and Dr. G. A. Reisner, will at once be evident from the references in our text.

Our excavations during 1929-30 were confined to: (1) the Pyramid, the passages and chambers of which were entirely cleared out, and the northern, eastern and western sides partly cleared; (2) the Pyramid Temple;

(3) the Pyramid Causeway; (4) the Great Mastabah Number 17; (5) various Tombs, of all periods, situated on our concession, which runs for a distance of three kilometres both to the north and to the south of the pyramid.

The scientific results of the season have proved to be of considerable value and include the discovery of stepped stages in Mastabah 17 and of the way in which the ancient builders calculated its levels; of a pit in the pyramid unnoticed by other explorers; of ancient level lines on the inner parts of the north face of the pyramid; of a tomb with about one hundred burials in it, and other discoveries to be described later.

Were it not for the poor quality of the rock at Meydûm, the existence of which is unhappily responsible for roof-falls upon the coffins in underground tombs which were not masonry-lined, we might have preserved for exhibition many coloured coffins of exquisite workmanship, the drawings of which are seen in our plates. As a matter of fact, roof-falls have done quite as much damage to some of the tombs as did ancient tomb robbers. In many cases, for instance, when we opened a carefully sealed tomb, we found that the only damage in the tomb had been caused by the rock itself and not by human agency. Mariette [27 : 459]¹ also refers to the poor quality of the rock at Meydûm. But in spite of all this we brought to light many valuable smaller objects, such as scarabs, amulets, bead pectorals of the Twelfth Dynasty, jewellery, figurines, toilet boxes, pottery, and the like, all of which will be published in due course.

From the following chronological list it will be observed that during the last one hundred and thirty-seven years trial soundings, excavations, and scientific observations have been made at Meydûm by a considerable number of archæologists; other people who have visited the site or described it are included for the interest attached to their notes.

II. CHRONOLOGICAL LIST OF PEOPLE ASSOCIATED WITH MEYDÛM SINCE THE TWELFTH CENTURY A. D.²

- 1117-1119 *Makrizî and Abû-Mohammed Abdallah*. Makrizî, an Arab historian (1364-1442), wrote: "There is another pyramid, called the 'Pyramid of Meydûm,' which is like a mountain, and has five stories"; he cites as his authority for this statement Sheikh Abû-Mohammed Abdallah, son of Abderrahîm el-Qaisi, who visited Meydûm in 1117-1119. [32 : 359, footnote 5; 73 : II, 354; 6 : 6]
- 1737 *Frederick Lewis Norden, F.R.S.*, a Captain in the Danish Navy, saw the Meydûm pyramid from the Nile. He gives three excel-

¹ Throughout the text, bibliographical references will be indicated by numbers in brackets: the numbers in bold face correspond to the numbers of the various works as indicated in the Index of Bibliographical References on pages 37 and 38; the numbers in ordinary type refer to the volume number (in Roman numerals) and the page of the work in question.

² A similar list, giving the names from the earliest times up to the twelfth century A. D., is in course of preparation and will be published later.

- lent sketches of the pyramid (which he thought was elevated upon a little hill of sand), together with a map showing the position of Meydûm. He records that he saw a number of "Chameaux d'eau" (obviously birds with long necks, perhaps flamingoes), which did not come near enough for him to shoot, and also that during the night the travellers were surrounded by many bats. After sunset they had to keep a good guard and fire off a musket every four hours as a warning to the people of the district that they could not be taken by surprise. [40 : I, 81; II, 10]
- 1737 *Pococke and El-Kebery*. Richard Pococke, LL.D., F.R.S., an English authority on Arabia, journeyed up the Nile in a boat and saw the Meydûm pyramid from a distance. He states that the pyramid was called El-Haram el-Kaddâb, "The False Pyramid," by the Moslems, and El-Haram el-Kebîr, "The Great Pyramid," by the Christians. "To go to this pyramid, it is necessary," he says, "to have a man from the Sheikh of this country called [el]-Kebery, who lives at Mocanan." He gives a sketch of the pyramid. [51 : II, Vol. I, 69, 70]
- 1776-1779 *M. Savary*, a French visitor, who spent three years in Egypt, mentions the Meydûm pyramid, which he calls "the southernmost pyramid of Egypt." [61 : II, 51]
- 1793 *W. G. Browne*, an English traveller, visited Meydûm and inspected the pyramid; he removed some débris from its corners in order to examine the outer casing. He was, he says, the first to recognize that the base of the pyramid was not hewn in natural rock, as was believed before, but built of stones. He gives a sketch of the pyramid. [10 : 170, 171]
- 1799 *V. Denon, Jomard, and Malus*, members of the scientific expedition accompanying Napoleon's army to Egypt, compiled a brief description of the Meydûm pyramid. Denon made sketches of it. Malus, and perhaps others, climbed the pyramid on the north side. [78 : 426, 427; 15 : 92, 93; 59 : III, 77-79]
- 1801 *Charles Barton Burr*, an Anglo-Indian Captain, left his name and date, August 18, 1801, on the upper part of the north face of the Meydûm pyramid. After the date is written: "British Indian . . . Bengal Goolam. Hassen . . ." [59, where the Captain's name is wrongly given as "Banon Burr."] Burr was a Captain in the British Army which occupied Egypt in 1801. The Superintendent of Records, India Office, London, kindly supplies the following information: according to the Bombay Army List of 1801, Captain Burr is shown as Commissary of Cattle on Foreign Service. His regiment (7th Bombay Native Infantry) was in Egypt at the time. Burr was appointed a Cadet in 1788; a Lieutenant on October 1, 1790; a Captain on March 6, 1800; a Major on October 8, 1807; a Lieutenant-Colonel on January 21, 1813; and made a Companion of the Order of the Bath on October 14, 1818. He died in Bombay on May 20, 1821.
- 1801-1826 *J. J. Rifaud*, a French traveller, of Marseilles, visited the Meydûm pyramid, which he briefly describes. The natives of Meydûm village were offering antiquities for sale. [58 : 191, 192]

- 1804 *Unknown Person* who cut the date, and his name, of which only the last letter, N, can be read, above Captain Burr's inscription on the Meydûm pyramid. [59]
- 1816-1818 *Robert Richardson, M.D.*, and the *Earl of Belmore*, saw perhaps the Meydûm pyramid, which the former calls the "pyramid of Asawee." [57 : II, 144]
- 1820 *C. Vidua*, a name inscribed on the east face of the Meydûm pyramid. (Noticed by the present writer.)
- 2 *H. Fosskett*, a name placed near Vidua's inscription on the pyramid. (Noticed by the present writer.)
- 1827-1828 *Mrs. Charles Lushington*, an English traveller, saw the Meydûm pyramid, apparently from a Nile boat. [26 : 112, 113]
- 1837 *Domenico Valeriani*, an Italian professor, in his description of Egypt, briefly mentions the Meydûm pyramid and gives two sketches of it made from the drawings of Denon. [70 : I, 38; 71 : I, 474-476]
- 1837 *J. S. Perring*, an English engineer, measured the pyramid of Meydûm, and made a sketch of it, together with a provisional section, which did not show the chamber and passages, as they were not cleared out until the time of Maspero in 1881-1882. He also dug two trial pits, one at the northeast angle of the pyramid, and the other on the western side, in order to inspect the base. [73 : III, 78-80; 41 : III, 19, 20]
- 1843 *Richard Lepsius*, the German Egyptologist (assisted by *Erbkam* and *Weidenbach*), measured the pyramid of Meydûm and prepared drawings of it. He cleared some débris from around the pyramid [24 : II (text), page 1]. *Bædeker* [1 : 18] says that the holes "in one of the faces of the pyramid are due to the examinations of Lepsius and Erbkam, to whom this pyramid was of great help for studying the construction of other pyramids."
- 1871 *H. H. the Khedive Ismail, Vigne, Daninos Bey, Youssef Bey Choudî, the Mudîr of Beni-Suef*, and the *Head Sheikh of Meydûm*. The workmen of M. Vigne, a lawyer of Alexandria, who had received permission from the Egyptian Government to look for animal bones in the ancient cemeteries of Egypt, found a limestone stela just to the north of the Meydûm pyramid. The Head Sheikh of Meydûm, hearing of the discovery, stopped the work and at once telegraphed the news of the find to H. H. the Khedive. A. Mariette, the Director General of the Department of Antiquities, ordered Daninos Bey to proceed to Meydûm via el-Wâsta station, where, according to his instructions, he was to be met by the Mudîr of Beni-Suef with a thousand workmen. Daninos, who was accompanied by Youssef Bey Choudî, one of the aides-de-camp to H. H. the Khedive, saw that the stela came from a mastabah belonging to a certain Râ-hotep and Nefert his wife. Near the stela he discovered the beautiful statues of these two persons which are now in the Cairo Museum. From a letter sent by Mariette to Daninos we gather that H. H. the Khedive visited Meydûm himself in order to see the statues. [33 : VIII, 69-73]
- 1871-1872 *Mariette, Vassalli Bey, and Daninos Bey*. Following the above-mentioned discoveries, Mariette, Vassalli-Bey — the keeper of

EXCAVATIONS AT MEYDÛM, 1929-30

the Bûlâq Museum — and Daninos Bey, carried out excavations at Meydûm for about a week onwards from December 25, 1871. They opened up some mastabah tombs to the north of the pyramid, and in the mastabah of Nefer-Maât found the famous "Panel of the Geese," now in the Cairo Museum, which Maspero, [30 : 62] describes as "one of the best pieces of Egyptian painting which is to be seen in any Museum in the world." [See also 29 : 4, 5; 27 : 468-487]

Said and Another Arab, unnamed. Daninos Bey records (1871) an Arabic inscription on the tomb of Nefer-Maât at Meydûm, which states that a certain Said had advised making excavations in this tomb in order to discover treasures. But as the excavator (another Arab) found absolutely nothing, he gave himself the satisfaction, at the end of the inscription, of heaping maledictions upon the head of the worthy Said, who had misled him by his false assurances. [33 : VIII, 73]

- 1876 (about) *W. J. Loftie*, an English traveller, visited Meydûm. He gives a more or less detailed account of the pyramid as well as of the tombs, and refers to certain unnamed members of his party who had visited the site before. [25 : 139ff; 201-213]
- 1877-1891 (date of publication) *George Ebers*, the German Egyptologist, wrote a brief account of the Meydûm pyramid and mastabahs for the 1877 edition of Bædeker's guide, *Aegypten*, and, for the edition of 1891, an extended account. He saw the pyramid from the Nile and gives a sketch of it. [17 : I, 172]
- 1879 *Villiers Stuart*, an Irish member of Parliament who visited Egypt and wrote some interesting comments upon its antiquities, describes the remains he saw at Meydûm. He removed some débris from the sides of the pyramid in order to examine its base. [67 : 27-39]
- 1881 (date of publication) *George Rawlinson*, the English archæologist, describes the Meydûm pyramid which he says some call a "pyramid" and others a "tower." He thought it was "emplaced upon a rocky knoll." [52 : I, 184, 185]. Rawlinson refers to Birch and Fergusson. [3 : 28; 21 : I, 100]
- 1881-1882 *G. Maspero*, Director General of the Department of Antiquities opened the Meydûm pyramid and cleared some mastabah tombs untouched by Mariette. [29 : 4; 31 : I, 149, 150; and *L'Archéologie Egyptienne*, 143.]
- 1882 *Villiers Stuart* (see 1879) again visited Meydûm as he had heard that Maspero had cleared out the pyramid chamber. He now gives further information about the site, and states (wrongly) that Maspero had removed the débris from the north face of the pyramid down to the level of the desert. [68 : 467 ff; 69 : Chapter IV]
- 1883 *Brugsch, Prince Friedrich Karl*, and *Von Garnier*. Heinrich Brugsch-Pasha, the German Egyptologist, together with Prince Friedrich Karl and Major F. X. von Garnier, saw the Meydûm pyramid from the distance. [11 : 49]
- 1883 (date of publication) *W. M. F. Petrie* gives some brief details of the Meydûm pyramid and mastabahs. [45 : 147, 148]

- 1887 *Unknown Person*, who wrote the date of his visit in the chapel of the mastabah of Rā-hotep at Meydûm. Petrie [42 : I, 15] writes as follows about this chapel: "Some traveller chose to unearth it, soon before 1887, which date is written in the tomb; and it has stood open since then, with the result that every face within reach is mutilated, most of the figures spoiled, and all the edges of the stone broken away. I completely reburied it."
- 1890–1921 (dates of publication) *E. A. Wallis Budge* describes during this period, in various editions of *Cook's Guides*, the site at Meydûm.
- 1891 *W. M. F. Petrie*, assisted by *F. Bliss* and *Fraser*, made excavations at Meydûm; he examined the inside of the pyramid, cleared the pyramid temple, causeway ends, and many tombs, and made the first complete map of the site. Petrie records that the local inhabitants used the stone from the pyramid for tombs and other structures. [42; and 46 : 138–147]
- 1891 *P. E. Neuberry*, the English Egyptologist, visited Meydûm during the time Petrie was working there. He copied the hieratic graffiti on the ceiling of the entrance passage of the pyramid. [39 : 102, 103]. The graffiti had previously been noticed by Maspero. [31 : I, 149, 150]
- 1893 (date of publication) *A. Mariette* published an excellent account of the Meydûm pyramid. [28 : Plate XV]
- 1897–1929 (dates of publication) *Georg Steindorff*, the German Egyptologist, made repeated visits to Egypt during this period for the purpose of revising Bædeker's *Egypt*, of which the edition of 1929 gives some details of Meydûm.
- 1897 *Borchardt* and *Reisner*. *L. Borchardt*, the German Egyptologist, and *G. A. Reisner*, the American Egyptologist, now of the Harvard-Boston Expedition, visited Meydûm for a few hours and took some photographs. [6 : 3]
- 1899 *M. A. Robert*, Inspector of the Register of the Land Survey of Egypt, visited Meydûm and placed a survey pole on the top of the pyramid. He records various graffiti on the north face of the pyramid, and a line of hieroglyphs in the same place; the latter he was not able to copy. The earliest graffiti are Ptolemaic and mention Plutogenes, the son of Philippos; Antikrates; and Philippos and Antiphonos, the sons of Antikrates. The other graffiti are given in this list under dates of 1801 and 1804. [59 : III, 77–79]
- 1908 (date of publication) *R. Weill*, the French Egyptologist, gives a full account of the tombs and finds at Meydûm. [75 : 273ff.]
- 1909–1910 *W. M. F. Petrie*, assisted by *E. Mackay*, *G. A. Wainwright*, *B. Fletcher*, and *Bushe-Fox*, made further excavations at and near Meydûm (see 1891). Among other things, he found two tombs inside the peribolus wall of the pyramid of the king, the southern one of which seems to have been originally a small pyramid, perhaps belonging to the queen. A pyramid constructional ramp was also found to the south of the causeway. [43 and 44]
- 1913 *Engelbach* and *Rohmer*. *R. Engelbach*, the English Egyptologist, together with *Sax Rohmer* (Ward), the novelist, and his wife, visited Meydûm, and entered the pyramid. The local natives asserted that Mrs. Rohmer was the first woman within their

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- knowledge to have visited the sarcophagus chamber. (Communicated by Mr. Engelbach.)
- 1926 *L. Borchardt* (assisted by *Dr. Wolf* and *Dipl.-Ing. Ricke*) again visited Meydûm (see 1897) and made important researches on the construction of the pyramid. He removed some débris from the sides in order to examine the base. His publication is accompanied by valuable drawings. Borchardt mentions that he found persons up on the pyramid who, as they said, "kept watch over their fields" from it. He did not observe any stone-hammers with them! [6]
- 1928 *The Aircraft Operating Company, Ltd.*, of London, made an air survey of Meydûm on August 17. A photograph was taken at an altitude of 11,000 feet. (Communicated by Survey Department of Egypt.)

The above chronological list will thus have given the reader some idea of the amount of work that has been done on the site in the past and of the names of the persons associated with such work.

III. THE SITE AND ITS NAME

The position of Meydûm in relation to the other pyramid sites of the Ancient Kingdom and the Middle Empire is shown in Plate VII, while the remains at present visible on the surface are shown in the plan in Plate VIII and therefore need not here be described. The most convenient railway station to Meydûm is El-Wâsta, some fifty-seven miles south of Cairo. El Wâsta is the district capital and the junction of the Fayyûm railway, and it lies four and a half miles southeast of the pyramid site itself. An automobile takes twenty minutes to reach Meydûm from the railway station, but when the inundation floods the region to the east of the pyramid, the use of both boat and automobile is necessary and the time occupied in reaching the pyramid is from two and a half to three hours.

The present village of Meydûm is in the cultivated area a little to the southeast of the site of the pyramid which is situated on the high desert plateau. That the village covers the ancient city of Meydûm seems fairly certain,¹ for various stelæ and stone blocks have been recovered from beneath the houses; some of these are in the house of the "Omda" or headman of the village. A fragment of a large red granite stela is to be found against the door of the new mosque; this bears no hieroglyphs but has inserted on it the upper part of the double crown of Egypt, and so forth, beneath a part of the emblem for Heaven displayed across the top.² On the desert edge,

¹ Napoleon's Expedition, which visited Meydûm in A. D. 1799, was certainly of this opinion: "Meydoun is moreover a fairly big village where it is thought there had been an ancient village." See 78 : IV, 426, 427.

² Perhaps from a temple; it might perhaps belong to the Ancient Empire. A limestone block in another house bears the cartouche of Rameses II.

about twelve hundred metres south of the pyramid, are some Roman tombs and Coptic houses, considerably plundered.

The earliest known mention of Meydûm is in an inscription in the temple of Deir el-Bahri at Thebes, erected by queen Hatshepsut during the Eighteenth Dynasty (about 1500), where we read of "The Temple Mer-Itum" (that is, Meydûm) of Thothmes I; this temple-name, which has been altered on the wall, seems originally to have read "The Temple Mer-Itum of Hatshepsut."¹ Mer-Itum apparently means literally, "The Place beloved of the god Itum (Tum)," so we may suppose that, at all events in the later periods, Itum was one of the great gods of the district.

Meydûm is also mentioned in later Egyptian times. For example, during the reign of Akhenaten (1375-1358), we meet with Ipy, a "chieftain of Meydûm, and scribe and overseer of the fields of the god Aten (*Iten*)."² This local reference to Aten is interesting. The next known mention of Meydûm occurs in the Papyrus Krall of the time of King Pedibast of the Twenty-third Dynasty (745-721), which refers to Wilheni, a prince of the citadel of Meydûm, and to other people associated with the site.³ Piankhi, the Nubian conqueror of Egypt (720), also mentions Meydûm, for he informs us that when he sailed northwards he found that the place had shut its gates in order to prevent the conqueror from passing through them. Piankhi then sent the inhabitants an ultimatum, saying: "Behold, two ways are before you; choose ye as ye will: open, and ye shall live; close, and ye shall die. My majesty will not pass by a closed city." The city immediately allowed the king to enter. [7 : IV, 419, 431, 432]

In the Greek papyri of the Ptolemaic Era, which are full of fascinating sidelights on the social life of the times, Meydûm was known as Moithymis, with the variations: Moithymeos, Moiethymis, Moiethumis, and Moethymis. For instance, Zenon of Philadelphia, a place not far northwest of Meydûm, received a letter from a certain Iason, as follows: "I went over to Moithymis to see Leon about the ground tax which he is trying to exact on the vineyard and orchard, for five years past, at the rate of three drachmæ for each aroura. I asked him then to wait and not to sell the wine until I wrote to you. So he has given us three days in which he is prepared to receive a settlement of accounts. Metrodorus also wrote to Hermolaos to stop proceedings until you had been written to." In other letters of the Zenon series (which according to Mr. Edgar date between 250-239) we learn of the threshing floor of Inaros, a native of Moithymis; of a vineyard of Moithymis; of an official of the same village who had sequestered some rent; and so on. Zenon was

¹ 38 : V, Plate CXXVIII. That Mer-Itum and Meydûm are one and the same site, there seems to be no reasonable doubt whatever. See also 23 : III, 38.

² 19 : 17, 27, Plate XV. Riqqeh is not far to the northwest of Meydûm. For an Aten Temple at Memphis, compare 30 : 169.

³ See 56 ; 66 : VII, 55, 65; 8 : 535-36.

originally a landowner and general manager of Apollonius, vizier of Ptolemy II.¹

It has been suggested that a certain estate-name, Methun, met with in the local mastabah of Nefer-Maât is the earliest form of Meydûm.² This estate-name means, literally, "the Fighting-place of the Bulls."³ Concerning the suggested identification, Professor Griffith wrote in 1892: "*Metun* [*Methun*] has a curious likeness to *Medun* [*Meydûm*]; but that is *all*; we do not know even whether *Metun* lay in Upper or in Lower Egypt. The modern name of the place was sometimes written *Medun* by early European travellers; the ears are often deceived as to *m* and *n* in a new name or word. . . . There is better reason for supposing that *Mertum* (really pronounced *Maitum*) is the ancient equivalent of the name. . . . [42 : 39]. Professor Maspero [31 : VI, 71] identifies *Methun* with *El-Matânia*, a village a few miles to the north of *Meydûm*, opposite *Lisht*.

Another place, which, according to Professors Griffith [42 : 40] and Erman [20 : 41], must be near *Meydûm* is *Ded-Seneferu*. This ancient town, mentioned on a statuette of the Middle Empire found in the *Meydûm* pyramid temple,⁴ was made famous by a magician named *Dedi*, who lived there in the time of *Khufu*. According to a story in the *Westcar Papyrus*, dating from the Hyksos period, *Hor-ded-ef*, the son of *Khufu*, spoke as follows to his father: "There is a townsman, *Dedi* by name, and he dwelleth in *Ded-Seneferu*. He is a townsman of one hundred and ten years, and he eateth five hundred loaves of bread, a haunch of beef in the way of meat, and drinketh one hundred jugs of beer, unto this very day. He knoweth how to put on again a head that hath been cut off, and he knoweth how to make a lion follow after him, with its leash trailing on the ground" [20 : 41].

The place named *Ded-Seneferu* (literally, "*Seneferu* Endures") calls to mind the *Ded* — "Enduring" — gang of quarrymen who operated in *Meydûm* during the time the pyramid was built [Plate VI, Numbers 11, 12]. The name of the magician, *Dedi*, belongs to the same root as *ded*, "enduring." Incidentally, in the Fourth Dynasty mastabah of *Râ-hotep* at *Meydûm*, there is actually mentioned a certain *Dedi*, who was the son of *Râ-hotep*.⁵

¹ Edgar, *Annales du Service*: XVIII, 160; XX, 26, 27; *Catalogue General, Zenon Papyri*, Nos. 59094, 59141, 59176, 59189, 59257, 59337, 59407; *Journal of Egyptian Archaeology*: XV, 118, 119. See also Comparetti and Vitelli, *Papiri Greco-Egizzi*: II, 167, 256; Grenfell and Hunt, *The Tebtunis Papyri*: II, 353-390; *The Flinders Petrie Papyri*: III, 100b; Eisner, *Papyri Iandanae*: 8; and others.

² Compare 42 : 39; 31 : VI, 71; 12 : 414; 23 : III, 64.

³ Compare 81 : II, 175.

⁴ The statuette belonged to the lady *Seneferu-khet*y; it is not of the Fourth Dynasty, as stated by Petrie.

⁵ Petrie 42 : 37, Plates X, XIII, XV. He is not the son of *Nefer-Maât*, as stated on page 40. Finally, in connection with *Ded-Seneferu*, it may be mentioned that Maspero [31 : VI, 71] writes: "Le nom du sheikh Daoud qui est appliqué à une butte surmontée d'un tombeau de saint située entre el-Ouastah et Zaouiet-el-Masloub, ne serait-il pas un reste du nom antique Didit, Doudit?"

Still another local site which can in all probability be identified in the ancient records is Şaft, or Şaft-Meydûm, a village just to the north of Meydûm; Mr. Edgar thinks that it is probably the Sophtis of the Zenon Papyri. [18]

About sixteen names of estates or villages, all evidently local, are preserved in the mastabah of Râ-hotep and about twenty-three in the mastabah of Nefer-Maât, at Meydûm. Among the places mentioned in the former mastabah are the following: "The Temple"; "The Place of Pots"; "The Red"; "The Herb-producer"; "Going-growing"; and "Entrance-barred"; [versions by Dr. Griffith in Petrie 42 : 38, 39]. Other estate-names from the same tomb are: "The Granary"; "The Field of Food"; "Bread"; and so on. In the mastabah of Nefer-Maât we meet with "Beautiful is Maât" (*Nefer-Maât*) — an estate named after its owner; "The Field"; "The Fighting-place of the Bulls"; "The Milk Pot"; "The Houses"; "The House of the Plough"; "The Nurse of Seneferu"; and others.¹ The last village reminds us of the village or estate near Beni Hasan, in Upper Egypt, called "The Nurse of Khufu." That Seneferu (who seems to have been the builder of the Meydûm pyramid) was the father of Khufu makes the similarity between the names "The Nurse of Seneferu" and "The Nurse of Khufu" all the more interesting. Another village-name in the mastabah of Nefer-Maât [42 : I, 26, 39; Plate XXI] is "... Seneferu," which is doubtless to be restored to "The Nurse of Seneferu" (*Menât-Seneferu*); on the opposite side of the inner part of the great door, this same name is found at approximately a corresponding place.

The "Lake of Sebek," or the Fayyûm lake, is referred to in Nefer-Maât's mastabah [42 : 20, 25, 39; Plates XVIII, XXIII] and in the neighbouring Fourth Dynasty mastabah Number 7 [42 : 20, 39; Plate XVI]. Sebek, the crocodile god, was of course the chief deity of the Fayyûm, which was sometimes called "The Land of Sebek" (*Ta-Sebek*) [31 : III, 64, 89]; and it is certainly therefore not by chance merely that a portion of a crocodile's skull found its way into the grave of the Canaanite(?) Gemesh discovered by us this year at Meydûm. The name of the god was sometimes used as part of a proper name; thus in the chamber of the Meydûm pyramid temple there is a graffito of about the Thirteenth Dynasty mentioning the man Sebek-hotep-em-sa-ef [42 : I, 40; Plate XXXII, 2]. Further in this connection, we must remember the names of the rulers Sebek-neferu-Râ, Sebek-hotep, and Sebek-em-sa-ef, who lived from the end of the Twelfth Dynasty onwards.

¹ 42 : Plates XI, XII, XV, XIX, XXI. In connection with the place Hut, mentioned in Plate XIX, compare the place Hut (here determined by a pig) mentioned in the Fifth Dynasty mastabah of Dua-Râ, an overseer of the two pyramids of Seneferu at Dahshûr. [Maspero, *Trois années de fouilles*, in *Mem. Miss. Arch. Fr.*, 1881-1884, Dahshur mastabah Number 2.] In a few instances there are slight differences between the hieroglyphic forms of the Meydûm estate-names as given by Petrie [42] and as given by Mariette [27].

Methen, a ruler of the temple of Seneferu at Letopolis and elsewhere, who was buried at Şaqqâra in the time of Seneferu, states in his inscription that he was a "monarch and deputy in the eastern Fayyûm," which must surely have included Meydûm, and also a ruler of the Southern Lake, evidently situated in the Fayyûm region [7 : I, 76-78; 64 : I, 1-7]. Whether the town "Gate of the Mansion of Khufu," mentioned on a Fourth Dynasty libation altar found by Petrie at Meydûm [43 : II, 6, 28; Plate XXXI] was near Meydûm or not it is impossible to say.

IV. THE PYRAMID

From the evidence afforded by the graffiti in its funerary temple [Plate XXXV, 2], it has been generally assumed that the Meydûm pyramid was made by Seneferu, the first king of the Fourth Dynasty,¹ who died about 2900 B. C. On the other hand, Dr. Reisner [53] suggests that it may have been made by Hûni, the predecessor of Seneferu. However this may be, it is quite certain that Seneferu had two pyramids both of which were called "Seneferu-appears," the southern one being distinguished from the other by the more specific title, "The Southern Pyramid, 'Seneferu-appears'." From a decree issued by Pepi I of the Sixth Dynasty and found by Dr. Borchardt near the northern stone pyramid of Dahshûr, it is evident that that particular monument is none other than Seneferu's northern pyramid. The decree in question was issued in honour of Seneferu, and exempted forever the tenants in the two pyramid towns of Seneferu, one of which was doubtless Meydûm, from carrying out any building works for the royal house, from giving food to any passing messenger, from paying irrigation taxes, and so on. It was addressed to certain high officials and is dated in the twenty-first year of the reign, about 2570 [5 and 76].

It has been suggested that one of the two pyramids of Seneferu was perhaps a cenotaph and the other a tomb, and in this connection some evidence showing the existence of a double cult of the king seems to be forthcoming from the inscription of Qed-shepses, a son of Seneferu, on a stela from his tomb at Dahshûr, from which we see that the prince was a "Priest of Horus Neb-Maât" and a "Priest of Seneferu" [74; 14 : 22]. *Neb-Maât* was the king's official name, which had something to do with his *ka* [22 : 72], while *Seneferu* was of course his personal name. Similarly, Ka-nefer, the eldest son of Seneferu, buried at Dahshûr, was "Director of the priests of Seneferu," and "Master of the secrets of Horus Neb-Maât" [14 : 23]. Also, the following kings appear to have had two "tombs": Zoser, at Şaqqâra and Beit Khallâf; Senwosret III at Dahshûr and Abydos; Amen-em-ĥat III at Dahshûr and Hawâra; and Eye (Ai) at Tell el-Amârna and Bibân

¹ Some authorities regard him as the last king of the Third Dynasty.

el-Mulûk, Thebes; the first monarch belonging to the Third Dynasty, the second and third to the Twelfth Dynasty, and the last to the Eighteenth Dynasty. Kings of Ne-wesr-Râ, Nefer-iri-ka-Râ, Men-kau-Ḥor, and, possibly, Wesr-ka-f, of the Fifth Dynasty, each had both a pyramid and a solar sanctuary. Further than this, according to Borchardt and Sethe [4], the Nefer-Maât associated with Meydûm mastabah Number 16 — the eldest son of Seneferu, if we may believe these authorities — is to be identified with the Nefer-Maât who had a tomb at Giza, which means that he had two sepulchres. This idea, however, is not accepted by Reisner [54], who thinks the Giza Nefer-Maât was not the same person as the Meydûm Nefer-Maât, and that the former was a son of Khufu.

The question which of the two pyramids could have been used for the burial place of Seneferu has been gone into at some length by Borchardt [6 : 14-16], who has come to the conclusion that it is not likely that the body of Seneferu was buried in the Meydûm pyramid. On the other hand, however, as we shall see later, Petrie found in the Meydûm pyramid some pieces of a wooden coffin of "the early plain style," which is surely evidence that a burial had been made in the pyramid during the Ancient Empire. Borchardt shows from the architectural details that the Dahshûr pyramid is later than the Meydûm one, and states that the beginning of the new sepulchre at Dahshûr was "bound up with the removal of the royal residence from the district of Meydûm to that of Dahshûr; which was the signal for the royal family, ministers of state, and officials to make their tombs around the new pyramid of their sovereign. It is remarkable what a number of members of the family and high officials are to be found there. . . ; there are also some of later periods, mortuary priests of Seneferu and persons who describe themselves directly as his descendants, or whose funeral inscriptions show them to be in some way connected either with him or with his place of burial. At the Meydûm pyramid . . . cemetery . . . no traces have been found of the burials of funerary priests, who generally liked to be buried on the scene of their work. It may therefore be assumed with certainty that the cult of the dead was principally practised at Dahshûr, and it was, therefore, there that King Seneferu was buried. This did not mean that the town of the Meydûm pyramid was altogether forsaken or that the estates bequeathed to the cult of the dead there were given up; part of the cult of the dead was carried on there too. This explains the charter of King Pepi I for 'Both pyramid towns' for sacrifices brought, monthly services offered, and divine ceremonies fulfilled for King Seneferu." Such are Borchardt's ideas concerning the two pyramids of Seneferu. He offers no opinion as to who could have been buried in the coffin discovered in the Meydûm pyramid. Could it not have been Seneferu himself, who perhaps died before the Dahshûr pyramid was completed, and whose body was perhaps after-

wards transferred to Dahshûr when the new sepulchre was completed? If we do not accept this theory, here postulated for the first time, it is difficult to explain, first, why it was necessary to carry on the cult of the king in both places, and second, why Qed-shepses and Ka-nefer called themselves both "Priest, and so forth, of Horus Neb-Maāt (a name associated with the royal *ka*)" as well as "Priest of Seneferu." Perhaps it was believed that the *ka* of Seneferu visited the original tomb from time to time (it could hardly have been believed that it remained there after the removal of the body), and, such being the case, it was necessary to carry on the cult of the king both at Meydûm and at Dahshûr. In connection with transferred royal burials of the Ancient Empire, one remembers that Khufu removed the burial of his mother Hotep-heres, the queen of Seneferu, from Dahshûr, probably, to Gîza (see below). We shall observe presently how the Egyptians of later times apparently thought that the Meydûm pyramid was the burial place of Seneferu, and also how the pyramid itself shows distinct traces of a removal of funerary equipment.

The following are the known officials who were connected with the pyramids of Seneferu; that is to say, those officials whose inscriptions directly mention the pyramids of the king:

Fourth Dynasty

Ka-nefer, an Overseer of the pyramid of Seneferu, Director of the priests of Seneferu, Master of the secrets of Horus Neb-Maāt, and so forth, eldest son of Seneferu, buried at Dahshûr [14 : 23 and 79, Plates 4, 5]. Although the inscriptions do not state whether Ka-nefer was priest of the Dahshûr or of the Meydûm pyramid, the position of his tomb would surely indicate that he was attached to the former pyramid. Nefer-Maāt of Meydûm was also an "eldest son."

Fifth Dynasty

Duā-Rā, concerned with the king's affairs, and Overseer of the two pyramids of Seneferu, buried at Dahshûr about the time of Saḥu-Rā [34 : 190 and 6 : 15, note 4].

Ankh-mā-Rā, concerned with the king's affairs, and Overseer of the Southern (that is, probably, Meydûm) pyramid of Seneferu, the son of Dua-Rā (see above) buried at Dashûr [34 and 6].

Henka, a Great One of the Ten of the South, Judge, Domain-administrator, Overseer of all the works, and Overseer of the two pyramids of Seneferu; end of the Fifth Dynasty. He is mentioned on a statue in the Vienna Museum and on a statue in the Berlin Museum, both of which are reported (without definite proof) to have come from Meydûm [80; 2; and 6 : 15, note 5].

Dada-em-ānkh, a Libationer priest of the pyramid of Seneferu, buried at Ṣaqqāra [27 : 196-201]. The inscription does not indicate

whether the priest was attached to the Dahshûr or to¹ the Meydûm pyramid, but it was probably the former one.

The only other known mention of the pyramids of Seneferu is in the Sixth Dynasty decree of Pepi I, referred to in the first paragraph of this chapter, and the following New Empire hieratic graffiti found in the Meydûm pyramid temple; these graffiti also mention the temple itself.

Eighteenth Dynasty

Aa-kheper-ka-Rā-senb, a Scribe, and son of Amen-mesu, the Scribe and Ritualist of the deceased king Thothmes I — “came to see the beautiful temple of the Horus Seneferu. He found it as though heaven were within it and the sun rising in it. Then he said: ‘May heaven rain with fresh myrrh, may it drip with incense, upon the roof of the temple of the Horus Seneferu.’” Dated in the forty-first year of Thothmes III, about 1460 [42 : I, 40, 41, Plate XXXIII, v]. The above rendering is after that by Mr. Gunn.

Mey, a Scribe, “came to see this very great pyramid of the Horus . . . Seneferu . . .” Dated in the thirtieth year of Amenophis III, about 1381 [42 : I, 41, Plate XXXVI, xvii].

Unknown person, a son of Pi-naḥsi. This graffito, now damaged, once mentioned the temple of Seneferu, in words somewhat similar to those of *Aa-kheper-ka-Rā-senb* [42 : I, 41, Plate XXXV, xvi].

Graffiti somewhat similarly worded to the above three, and also of late date, are found in Twelfth Dynasty private tombs at Beni Ḥasan; that is, those of Khnum-hotep and Amen-Amen-em-ḥat. Curiously enough, these particular graffiti say the visitors came “to see the temple of Rā-Khufu” (Cheops). The mistake may have occurred through the mention in the original inscription of Khnum-hotep of the city “Nurse of Khufu,” a city already referred to in Section II above. One of the visitors was the “Royal Scribe, Amen-mes,” whose name and titles remind us of the “Scribe Amen-mes,” who wrote one of the graffiti on the ceiling of the Meydûm pyramid passage [Plate XXXIX, 2]. Compare, too, the name of the father of *Aa-kheper-ka-Rā-senb*. The Beni Ḥasan graffiti are published by Maspero [31 : IV, 127, 128].

From the above graffiti it will be seen that the scribes of the Eighteenth Dynasty certainly believed that the Meydûm pyramid was erected by Seneferu. Other references to the king in the graffiti in the pyramid temple of Meydûm are as follows:

An unknown person of the Sixth Dynasty, or earlier, mentions that the name of Seneferu is Wen-en-neferu (Onnophris). “He who exists thrice beautifully” [42 : I, 10, 40; Plate XXXII, i]. Long after Seneferu died the title Wen-nefer, “He who exists beautifully,” became a favourite title for Osiris, a god who is never met with in

¹ Other priests of Seneferu, not all of his time, are mentioned by Petrie [47 : I, 48, 49]; Maspero [32 : 363, note 3]; and Borchardt [6 : 15, notes 3, 4].

the inscriptions until the end of the Fifth Dynasty. Concerning this title, Mr. Gunn writes me that "the *nfr* is not simply adjective, *nûfer*, but pseudo-participle, *nofrew* or *nofrej*; *wnn* is of course the participle, so that we have something like 'he who is good' (literally, 'he who exists beautifully' or, 'he who exists well')."

An *unknown person* of the Sixth Dynasty, or earlier, mentions that "the name of the Horus-Seneferu . . . is Wenen-neferu." Noticed by the writer on east wall of the chamber. The great age of this graffito and of the one above-mentioned, which are scratched on the walls, is testified by the fact that they are exactly the colour of the stones of the temple.

Netri-mesu, of the Eighteenth Dynasty, an Attendant at the feet(?) of the Lord of the Two Lands, mentions Seneferu in association with various gods, all of whom, including Seneferu himself, he prays, may give him (*Netri-mesu*) glory in heaven, power on earth, and drinking water upon the . . . of the river, and a smelling of the sweet air of the north wind [42 : I, 41; Plate XXXV, xiv]. The above rendering is after that by Mr. Gunn.

The name of the king also appears in the following proper-names found at Meydûm: *Menât-Seneferu*, "The Nurse of Seneferu," a village-name of the Fourth Dynasty; . . . *Seneferu*, perhaps also *Menat-Seneferu*, a Fourth Dynasty village-name found in the same mastabah as the preceding; see above; *Seneferu-khety*, a lady of the Twelfth Dynasty; and *Seneferu-ânkh*, scratched on the ceiling of the passage in the pyramid temple, and noticed by the present writer. (See above page 13, footnote 4.) According to Mr. Gunn, the hieratic graffito in the temple, published by Petrie [42 : Plate XXXIV, vi], does not read Senefer(u?) but *sešh qedwt*, that is, "the draughtsman."

A queen of the king who built the Meydûm pyramid was perhaps buried in the small pyramid seen in Plates I and III. Seneferu seems to have had three queens: Meres-ânkh, mentioned in the graffito of the Eighteenth Dynasty scribe Āa-kheper-ka-Râ-senb, in the Meydûm pyramid temple, and possibly in an inscription in the Cairo Museum; Hotep-heres, the mother of Khufu, whose transferred burial was found at Giza in 1925, during the time that the present writer was with the Harvard-Boston Expedition; and, lastly, Merititebes, named on a stela from Giza on a statue at Leyden, and on a vase from Byblos, in Syria. On the subject of these queens see: 37; 47 : I, 46, 49, 51; 53; 55.

So far as we know it, the history of the Meydûm pyramid, which as long ago as A. D. 1737 (see above), was known as El-Haram el-Kaddâb, "The False Pyramid," by the Moslems, and El-Haram el-Kebîr, "The Great Pyramid," by the Christians, is as follows: it was probably built at the commencement of the Fourth Dynasty by king Seneferu, who placed a pyramid temple, a causeway, and a valley temple on its eastern side. The exist-

ing evidence clearly shows that, at one part of its career, it was a seven-staged building, and that later it was made into an eight-staged building, and later on still, into a true pyramid in form. From the fact that the faces of both the inner stages referred to are smooth-dressed, and possess sockets for the metal bars supporting the door seals, it would certainly appear that the structure was originally intended only to be staged; some support for this theory is perhaps given by the quarry marks showing the building in stepped form [Plate VI]. Borchardt, from the evidence afforded by these quarry marks, thinks that the first plan may possibly have been a two-staged small pyramid about forty metres long on each side; this may, on its completion, have been reconstructed into a larger three-staged pyramid¹ (the four-staged pyramid quarry mark was not found at the time Borchardt wrote his account), and so on. This idea is a very plausible one, but it is a peculiar thing that of the ten "accretions" found by Wainwright in the base of the pyramid [44 : 25, Plate XIV], only the joints of the outer faces of the seven and eight-staged parts of the pyramid are visible in the sloping entrance passage [Plate X]. Petrie thinks that the pyramid may have been built around a central mastabah [42 : I, 5, and 46 : 142, Figure 110], and this may possibly have been the case, for it certainly seems that the idea of a stepped pyramid was derived from the idea of a stepped mastabah, such as that of king Sa-nekht of the Third Dynasty at Beit Khallâf [Plate IX, 17] and that of the unknown person of the Fourth Dynasty for whom Mastabah 17 was built at Meydûm [Plate II]. The stepped pyramid of Zoser, the predecessor of Sa-nekht, of the third Dynasty at Saqqâra, shows more clearly its derivation from a mastabah than the Meydûm pyramid, for it is elongated in plan like an ordinary mastabah. From the section in Plate X, it will be seen that the platforms of the Meydûm pyramid stages slope slightly inward. Various loose blocks found in the débris against the side of the pyramid are dated in the fifteenth, sixteenth, and seventeenth years of the reign, and as these blocks perhaps formed part of the outer casing, they possibly afford evidence as to the time the pyramid was completed [Plate XXXVIII, 2; also see 43 : II, 2, 9, Plate V, and 48 : 10ff]. Reisner [53] states that "the length of the reign of Sneferuw is still uncertain. In the Turin Papyrus, one of the later lists of kings and dynasties, Sneferuw is given twenty-four years under the accepted arrangement of the fragments. In the version of Manetho's list preserved by Africanus, he receives twenty-nine years. M. Daressy estimates that the space assignable to Sneferuw in the Annals (Palermo Stone) would represent twenty-four years, while Sethe estimates it at thirty

¹ Borchardt's conjecture [6 : 10] that "the block with the two-step mark was destined for the building in the two-step stage; those with the three-step mark for the next three-step design," is not supported by our new evidence, which shows that the various classes of step-pyramid signs were used indiscriminately on the stones. See description of Plate VI in the present work.

to thirty-two years or less. The fifteenth year of Sneferuw is the highest preserved in the Annals, and the calculated space in the same document allows not more than thirty-two years. Thus the evidence indicates a reign of about twenty-four to thirty years, slightly longer than the general average."

From the details given in Plate VI, it will be observed that we have identified seven gangs of quarrymen who were associated with the building of the Meydûm pyramid and neighbouring structures. These gangs are the "Stepped Pyramid Gang," the "Boat Gang," the "Vigorous Gang," the "Sceptre Gang," the "Enduring Gang," the "North Gang," and the "Sound Gang." It is quite possible, as in the case of the gang names of the Fourth Dynasty known at Gîza, that these names in their full forms were compounded with that of the king. Thus, the third gang might well have been called "How Vigorous is Seneferu," the fifth, "How Enduring is Seneferu," and so on. However, the full name of one of Seneferu's gangs of workmen, namely, "The craftsmen-crew, 'How beloved is the White Crown of Seneferu,'" is met with on a copper adze of the Fourth Dynasty published by Petrie [43 : II, 43, Plate XXXVII, 40, and 42 : I, Plate XXIX]. Khufu, the son of Seneferu, had a gang somewhat similarly named: "The craftsmen-crew, 'How powerful is the White Crown of Khnum-Khufu'"; this name appears among others in one of the upper chambers of the Great Pyramid at Gîza, and was copied by Vyse in 1837 [72]. Other crew names of later date have been found in the sanctuaries at Abusîr, south of Gîza. Another quarrymen's expression found on the limestone blocks at Meydûm [43 : II, Plate V], and also at Gîza, is *Wer-sa*, namely, "The Great One of the Company [of Quarrymen]." This of course must be the title of the chief quarryman. As will be seen from Numbers 2 and 4 in the same plate, and from Number 3 in our Plate VI, some of the blocks had the names of two gangs on them, and this may be accounted for by assuming that two gangs had to deal with each of the blocks in question. Other quarry marks are given in Plate VI of Petrie's work. Mention has already been made above of the pyramid blocks dated in the fifteenth, sixteenth, and seventeenth years of the reign of the king. The names and dates were certainly placed on the blocks before the stones left the quarry, probably with the object of making a tally of the number of stones turned out by each gang at the end of each day. Compare the daily quota of bricks which the Israelites had to supply (Exodus v : 8-19). One interesting fact must be mentioned, and that is that all the quarrymen's inscriptions referred to above are found only on the good limestone blocks.¹ These blocks obviously came from the hills on the eastern side of the Nile. This means of course that the marks in question belonged solely to the quarrymen in the eastern hills, and not to the men who removed the coarse local stone found in the quarries near the pyramid itself, and who, in certain

¹ The same remarks apply to the quarry marks found at Gîza.

instances and with only one known exception, used a few meaningless lines on their stones. The exception referred to looks something like the place-name *Per-Ma*, "The Residence." (See, in this connection, Gauthier, 23; II, 81.) The first person to have remarked on the unusually frequent appearance of the quarry marks at Meydûm was Perring, who visited the site in 1837; while Lepsius, 1843, noticed many marks shaped like a circle with a cross in it; see the chronological list above. Petrie found a piece of stone there bearing some "accounts" of the pyramid builders [43 : II, 2; Plate XIV, i]. At Beisan in Palestine we noticed that the Byzantines used letters of the Greek alphabet for quarry marks. Bricks from the Canaanite fort of Rameses II at the same place bore peculiar signs which are possibly gang emblems [60].

In connection with the original storied appearance of the pyramid and of Mastabah 17 at Meydûm, it is very interesting to bear in mind the stepped appearance of the mortuary buildings shown as determinatives to the word *îā*, "to mount," in the pyramid texts of the Fifth and Sixth Dynasties [Plate V, 42-46]; these stepped buildings sometimes interchange with buildings of mastabah-like shape in elevation [Plate V, 20-41]. The great importance of these analogies should be borne in mind, as they tend to show that the known stepped funerary buildings, such as those at Meydûm, the stepped pyramid of Zoser at Saqqâra, the stepped mastabah of Sa-nekht at Beit-Khallâf [Plate IX, 17], and the peculiar stepped buildings at Abydos surmounted with two stelæ like those in our pyramid temple [Plate V, 2, 3], were by no means the only buildings of their kind extant under the early dynasties.

How long ago the Meydûm pyramid was first used as a quarry for stone we do not know exactly, but it may possibly have been entered in that period following the close of the Ancient Empire known as the First Intermediate Period, that is, from the Seventh to the Tenth Dynasty, about 2475-2160 [13 : 168], at which time no doubt a certain amount of destruction took place not only on the pyramid at Meydûm but also on the pyramids elsewhere. Petrie, Maspero, and Borchardt think that it was Rameses II who first largely trespassed on the pyramid;¹ we know for a fact that the pyramid passage was open about this time, because of the presence on its ceiling of the graffiti of the scribes Sekri and Amen-mes, which, according to M. Černý, date from the first half of the Nineteenth Dynasty, not from the Twentieth Dynasty as stated by Maspero and Newberry (see references in description of Plate XXXIX, 1). A "royal scribe, Amen-mes," who wrote a graffito in a tomb at Beni Hasan has already been referred to above. The destruction by Rameses II does not seem to have affected the pyramid temple by covering

¹ Compare Petrie [42 : 5, 9, 19, 34]; Maspero [32 : 360], who thinks the stone was used for buildings at Heracleopolis, in the Fayyûm; and Borchardt [6 : 6].

it in with *débris*, because graffiti dating as late as the Twentieth Dynasty (M. Černý's dating) are found inside it. After that period, however, the temple seems to have been covered in, for some burials of the Twenty-second Dynasty were found in the *débris* over its roof. As a matter of fact, the majority of the intrusive burials in the *débris* against the sides of the pyramid date from about the time of this dynasty. According to the witness of Sheikh Abû-Mohammed Abdallah, who visited Meydûm in 1117-1119 (see above, Section II), there then existed five stages in the pyramid, two of which have disappeared since his time, which happened certainly prior to 1737, the time of Captain Norden's visit, when, as his sketches show, there were three stages. Perring mentions in 1837 [73 : III, 78-80] that the bridge at Tahme, thirty kilometres north of Meydûm, was built of blocks from the Meydûm pyramid, while Petrie, in 1891, writes "the pyramid of Meydûm is the quarry of all the neighbourhood. Large piles of stone are to be seen in the villages, all taken from there. The desert is furrowed with cart tracks in all directions from the pyramid. Every decent Medûmi that dies has a stone tomb built of pyramid casing" [42 : I, 4]. When Borchardt visited the pyramid in 1926 he found that much damage had been done to it since his previous visit in 1897 [6 : 6]; as will be seen from the chronological list given above, the pyramid was first opened in modern times by Maspero in 1881-1882 and subsequently examined by Petrie in 1891.

The clearing out of the pyramid passages and chambers was a long, tedious, and suffocating job, and our men were only too pleased when this part of our excavations was completed. The chief objects found in the pyramid are shown on Plate XV, 10-16. Other objects consisted of small pieces of wood, fragments of Roman bricks, Arab clasp-knives, pieces of broken bottles and so forth. Evidence was forthcoming that bats and owls once lived in the pyramid. In many places the *débris* reached to within a metre of the ceiling. Our plan and section of the interior are given in Plate X, which also shows the ancient builders' level lines, cubit signs, and pyramid centre lines [Petrie, 49], all of which are self explanatory. The cubit used in the pyramid appears to be fifty-two and one-half centimetres. It is interesting to note, as mentioned before, that the platforms of the inner stages slope slightly inward, the inner end being fifteen centimetres lower than the outer end. From the evidence at present visible, it is certain that the courses of masonry in the many accretion stages in the four sides of the pyramid are not horizontally laid but slope inwards to a common centre. The under part of the base at the north has not yet been cleared, so the foundations of Stages I and II in our drawing are restored from Petrie's section. The lower part of the passage and antechambers bear an exact analogy to a number of large Fourth Dynasty tombs [Numbers 204, 202, 251, 277] to be described later, which were excavated by the Expedition at Meydûm, for in each instance a

trench was cut in the rock and afterwards lined with masonry. The slots in the sides of the pyramid passage [Plate X] are D-shaped and probably held metal bars for the purpose of preventing the blocking stones¹ from sliding down the passage. No such slots appear inside the present entrance (the sides of which were cut away so as to hold a wedge-shaped block), but are found in the entrance of the eight-story stage; one slot is found in the east wall near the entrance of the seven-story stage. The average angle of the outer sloping casing is $51^{\circ} 52'$, while that of the faces of the "accretions" is variable, being said to average $73^{\circ} 20'$ for the upper portions and $74^{\circ} 21'$ for the lower portions [42 : I, 6, 7]. In the same place Petrie says that the original height of the pyramid was 301 feet 7 inches, and the present height, 214 feet 8 inches. The angles of the "accretions" and the height of the pyramid will be checked by us after we have made our pyramid ladder, for the figures here given were made from the ground.

The entrance passage descends 57.85 metres (sloping length) to the first ante-chamber. It is not a uniform slope, but has a dip in it; from the commencement of the floor at the outer entrance to a distance of 13.35 metres (that is, to the face of the seven-staged part of the pyramid) it is $30^{\circ} 23'$, and from the latter point to a distance of 20.55 metres from the entrance it is $29^{\circ} 22'$, while from the last mentioned point to the first ante-chamber it is $27^{\circ} 36'$. The direct slope between the entrance and the end is $28^{\circ} 29'$. This error, here noticed for the first time, probably arose in part through the additions of the pyramid "accretions". The outer faces of the seven-story and eight-story stages in the construction of the pyramid can be detected by the broken joints in the walls, floor, and ceiling of the passage. The original right-angle height of the whole of the passage was about 155 centimetres, while the perpendicular height was 185 centimetres. Near the lower end of the sloping passage, at 53.95 metres from the entrance, we found a small pit in the floor; this pit extends for the whole width of the passage, is 55 centimetres across from north to south, and 292 centimetres deep, of which the lowest 78 centimetres are in the rock. It was unnoticed by previous explorers, and was perhaps used for funerary offerings; one would hardly expect it to have been used for a portcullis, because there is no corresponding slot in the ceiling. About 125 centimetres beyond the pit, to the south,

¹ Borchardt [6 : 12; Abb. 2] thinks the entrance block of the eight-story stage was pivoted, but there is no direct evidence of this. On the contrary, we are inclined to agree with Somers Clarke and Engelbach [13 : 168], who write as follows on the subject of pyramid doors: "Strabo, referring to the Great Pyramid, relates that there is 'a stone that may be taken out, which being raised up, there is a sloping passage.' This has been taken to mean that there was a stone, hinged at the top of each side, which opened flap-wise. Some support is given to this idea by an examination of the south pyramid of Dahshûr . . . ; but the entrance to the Third Pyramid at Giza shows no recesses at all, and it cannot be believed that, once kings were buried in their pyramids, they were in any way open to the priests or to the public; their temples were the places where the offerings and the prayers were made. . . . By Strabo's time, however, it is not impossible that the entrance to the Great Pyramid may have been fitted with some such door as he describes."

we found a small slot, 14 centimetres wide and 20 deep, running round the sides, ceiling, and floor of the passage. This was evidently for a wooden door, for we observed pieces of wood in the floor slot. Incidentally, a wooden door was discovered by Petrie in the Fourth Dynasty mastabah of Nefer-Maât at Meydûm [44 : 25, Plate XVI], and traces of a great double door of wood at the end of the pyramid causeway (see below). A little to the south of the wooden door in the pyramid, the sloping passage enters the first ante-chamber, the horizontal floor of which is 15 centimetres below that of the passage end. The dimensions of this chamber are: north to south, 260 centimetres; east to west, 220 centimetres; original height, about 180 centimetres. A door to the south measuring 60 centimetres from north to south and 85 centimetres from east to west, that is, having the same width as the passages, leads into the second ante-chamber, the dimensions of which are: north to south, 265 centimetres; east to west, 210 centimetres; original height, about 180 centimetres. In both these chambers were found some rectangular blocks of limestone measuring 52.5 centimetres by 42 centimetres by 36.5 centimetres, which must have formed part of the sealed masonry doors of the chambers. A small passage, 365 centimetres in length, runs from the second ante-chamber to the base of the shaft ascending to the sarcophagus-chamber. The shaft at the base is 117 centimetres from north to south and 85 centimetres from east to west. The floor stones have been removed from the base of the shaft and partly from the south end of the passage, where there is a slot in the rock, while the southernmost ceiling-stone of the passage is partly broken away. It looks as if all this destruction had been carried out, by priests or by robbers, as the case may be, in order to facilitate the removal of the funerary equipment. Compare the remarks of Maspero, who states that "an apparatus of beams and ropes still in place above the orifice [when he opened the pyramid in 1881-1882] shows that the robbers took the sarcophagus out of the chamber back in antiquity." From the present (rock) floor of the shaft to the top of the paved floor of the sarcophagus-chamber is a distance of 665 centimetres. It will be noticed from the section that there are wooden baulks in the shaft. There are three of these in all, one on the west and one on the east side (for the purpose of holding up the overhanging rock), supporting a third against the face of the south side. The floor of the sarcophagus-chamber is of rock paved with stones, many of which are now removed. The sarcophagus-chamber itself is not very large; it is 590 centimetres long, 265 centimetres wide, and 505 centimetres high. The acute slope of the corbelled roof exaggerates its actual height. In the south wall is a small recess made by robbers. Two baulks, of which only the stump of one now remains (indicated by the two XX's side by side in the section) were fitted not far above the spring of the roof at the north end; a third (now missing) was almost between and just above them,

and a fourth, a short one (Y), in the angle of the roof. [See the Plate XXV, 1, 2.] Another baulk ran across the top of the south end of the chamber. A stump, which is in the north wall of the shaft, and level with the floor of the chamber, shows that a baulk once lay across the eastern part of the shaft in line with the north-south axis. All the baulks are heavily impregnated with the salts which have come out of the stone blocks. Not a fragment of a stone sarcophagus was found in the chamber or elsewhere in the pyramid. Petrie [42 : I, 11] records that at the bottom of the shaft were lying pieces from a wooden sarcophagus, of the early plain style, which had been very violently wrenched open and destroyed.

The objects found in the débris against the sides of the pyramid and in the débris near the pyramid temple are shown in Plates XIV and XV. These objects were found either by themselves or associated with poor burials of the late period, say from about the Twenty-second Dynasty onwards.

Apart from the objects shown in the plates, there were discovered among the débris against the north face of the pyramid some fragments of mummy cloth, plaited human hair, and some fibre ropes, all from disturbed burials. Near the present top of the outer casing was a primitive rectangular coffin made out of palm-leaf stems which were knotted together, at distances of 12 to 15 centimetres, with fibre. Inside the coffin was the mummy of a child of about two years of age. Further down in the débris and about 13 metres from the pyramid face, was a skeleton of an adult wrapped in cloth and encased with palm-leaf stems tied with ropes. Its head was to the west. Apart from a small, blue bead, a spindle-whorl rod, and some pieces of charcoal from the child's burial, nothing was found with these two interments. A quarrymen's inscription from here is shown in Plate XXXVIII, 2; another such inscription reads: "Year 16(?)^p, first month of the winter season." Among the débris on the west face there were found the scattered remains of a late burial, which included a Hellenistic lamp [Plate XIV, 19], a bronze coin of the third century B. C. (Ptolemy II-IV), broken wooden hair combs, a piece of plaited human hair, a sacred-eye amulet, a broken faience bead-spreader, a few beads, pottery fragments, a piece of a mat used for mummy covering, some cord, and pieces of wood. From the débris against the east face and on and around the pyramid temple there came a mummy encased with reeds from a point high up in the débris to the north of the pyramid temple, about two metres from the pyramid face. Its head was to the north. The body was protected from the débris by flat stones laid around it. A little lower down was another reed burial, head to north, also protected by stones; a shell and two small faience beads were the only objects found with it. From further south and close to the pyramid came the steatite scarab shown in Plate XV, 3. Above and a little to the north of these burials were four rather large two-handled water jars of red ware covered with a yellow-

ish wash. They were standing upright in a line close to one another and next to the pyramid face; see the note in Plate XV. Three of the jars had flat stones over their mouths, while the fourth had a mud stopper. At a somewhat lower level, the body of a child was found wrapped up in a fibre-string bag. Higher up in the débris, and still to the north of the temple, were some palm-leaf stem encased burials, with heads to the north. Two of these belonged to children and two to adults; of the latter, one had a newly born infant with it and had an outer covering of palm fibre. Some shell beads came from one of these burials. Not very far away was another palm-leaf stem burial of an adult, with the head to the south; near its feet was lying part of a fishing net. Four more poor burials were discovered in the débris north of the temple. The first was a mummy encased in reeds, and the second a mummy in palm-leaf stems; in both cases the heads were to the north. The third burial consisted of a child in a fibre bag, and the fourth in a reed-encased mummy. The most important object from the above mentioned northern débris is the seal of Sheshonk IV of the Twenty-second Dynasty [Plate XV, 4]. The débris above the roof of the temple had not been cleared by Petrie, and in it we found a number of burials. Lying close to the top of the north wall of the temple, and at right angles to it, was a broken wooden coffin; it was some six metres from the pyramid. Near the top of the southeast corner of the roof was a reed-encased mummy, head to the north. The mummy was in good condition originally, having been carefully bandaged. Over the outer wrappings was a thin skin or leather covering, of which the part over the head showed some stitches.¹ By the side of the burial was a two-handled reddish ware jar, with the mouth broken. It contained some organic matter. Against the south wall was a poor anthropoid coffin of late date, which held a few bones. From near the

¹ It is interesting to compare the statement of king Senwosret I (Twelfth Dynasty, 1980-1935) to the official Sinuhe: "Thus shalt thou not die abroad, nor shall the Asiatics bury thee. Thou shalt not be placed in a sheepskin" [20 and 35]. The text perhaps indicates that burial in a sheepskin was an Asiatic (perhaps nomadic) custom. Herodotus, *History II*, 81, writes: "Nothing of woollen, however, is taken into their temples or buried with them, as their religion forbids it. Here their practice resembles the rites called Orphic and Bacchic but which are in reality Egyptian and Pythagorean; for no one initiated in these mysteries can be buried in a woollen shroud, a religious reason being assigned for the observance." Maspero adds: "Sheepskin was occasionally made use of in burials; one of the mummies of Deir-el-Bahari (Number 5289) was wrapped in a white skin with the fleece attached. As this mummy is that of a nameless prince who appears to have died of poison, it may be asked whether the sheepskin was not reserved for people of a certain class, prisoners or executed criminals who were condemned to be impure, even in the tomb. If this were the case, it would explain the position occupied by the mention of a sheepskin in the royal rescript. Pharaoh, in promising to Sinuhit that he should be carried to the tomb with solemn dignity of princes or of the wealthy, and that his mummy should not be wrapped in the sheepskin of condemned persons, assured him of complete pardon in the future life." Compare also Maspero [30 : 363, 424, 427, 467, 469] when he describes the Fifth Century Christian covered with linen and sewn leather; the mummy of king Set-nekht, Twentieth Dynasty, encased in red leather; the mummy of the Eighteenth Dynasty, sewn in white sheepskin, and leather from the "braces" of the mummies of the high-priests of Amen found at Deir el-Bahari. See also Smith and Dawson [65 : 142, 143].

roof came a broken hippopotamus-vase. This may well represent the hippopotamus goddess of the Fayyûm, who was called The White [81 : III, 212]. Near the northeast corner of the temple and on the roof was a reed-encased mummy with head to the south. Outside the northeast corner was a poor mummy wrapped in fibre mats. The head and chest were protected by a flat rectangular fibre basket. Next to the head were a small round basket of fibre and a jar containing an infant; the jar was standing upright and originally had a mud sealing. The three-handled jar shown in Plate XV, 7, was lying nearby. From the same area came the jar Number 22 on the above plate; when found this was lying on its side with the mouth to the south. It contained the mummy of an infant.

This concludes our account of the excavations inside and about the outside of the pyramid; the pyramid temple and the pyramid causeway will be dealt with in the next section. Nothing need be said here about the constructional ramp to the east of the pyramid [Plate VIII], as this was not touched by us during the season and has been fully described by Petrie¹. For other ramps found at Meydûm and for the great ramp upon which, according to the pyramid texts, king Unis of the Fifth Dynasty was supposed to ascend from earth to heaven, see Chapter V.

V. THE PYRAMID TEMPLE, SILO, AND CAUSEWAY

A. *The Pyramid Temple*

The temple on the eastern face of the pyramid discovered in 1891 by Professor Petrie was not completely cleared by him, wherefore it was decided to uncover and thoroughly examine this important building, perhaps the most interesting part of the pyramid complex. We found the temple covered with an immense amount of débris, part of which was thrown down intentionally by Petrie in order to preserve the building from destruction by stone-robbers, and the other part, that over the roof and against the east and north sides, accumulated since about the Twentieth Dynasty. The undisturbed débris could easily be recognized by the white colour of the stone chips, by regular stratification, and above all by the untouched burials found in several places and already dealt with in the last chapter.

After the débris had been cleared down to the rock surface between the temple and the head of the causeway [see Plate XII], we noticed that the rock sloped slightly downwards towards the temple, and that it had a slight, per-

¹ Compare 43 : 2, 6, 8, where it is referred to as "the approach." Borchardt believes another ramp existed to the south of the pyramid (see Plate VIII of the present work); he also thinks that the shallow grooves on the present east face of the pyramid (see pyramid section on the same plate) do not indicate the "ka-chamber" as thought by Petrie [42 : 10; 43 : 1, 2], but merely the end of the eastern ramp of construction. He found a similar groove on the south face which perhaps belonged to the ramp on that side of the pyramid [6 : 20-24].

haps natural dip, running from north to south, about half way between the two above-mentioned points. In places near the east side of the temple were signs of the original mud-plaster floor. A layer of blown sand mixed with pieces of limestone, about half a metre thick, covered the rock floor in front of the temple; above this, and roughly between a point a little to the east of the temple door and the west side of the rock dip, was a thick layer of black charcoal dust containing many pieces of burnt wood, several fragments of bowls and dishes, a broken goblet and a pot-stand, all of crude red ware, with black centre, and all blackened by fire. Below the fireplace itself, which we found, were some Fourth Dynasty model offering dishes and fragments of crude hand-made jars. Mixed up with the black layer and also in the sand in the corresponding level to the north of it was a quantity of cow and sheep dung. The big blocks and débris thrown down by the pyramid stone-robbers were above this layer. Taking all these finds into consideration, it is obvious that for some period of its history the temple had been used as a habitation, doubtless by shepherds. Its ceilings are considerably blackened in places, as if by smoke. Moreover, a silo was found near its southeast corner; this will be described later. Since Petrie discovered an intrusive burial, which he dates Eighteenth Dynasty, in the entrance passage of the temple, it is quite certain that the temple was not used as a habitation after this interment was made. Petrie states [42 : I, 9, 34] "The temple contained about two feet of blown sand. It was evident that the courtyard had been blocked between the Twelfth and Eighteenth Dynasties, as all the later graffiti were within the light of the outer door, and pieces of burnt papyrus plant strewed the chamber floor, having been taken in by persons wishing to see the blocked doorway into the courtyard, which we found much smoked. In this sand in the passage was an interment of the Eighteenth Dynasty, with some [blue] beads, two small bronze lance heads, and some pomegranates and nuts. This burial explains why I found the outer doorway carefully blocked with pieces of stone; evidently the passage was looked on as a convenient sepulchre, and the door was blocked, and covered with rubbish. . . . In the sand in the passage were a few objects probably of the Fourth Dynasty. Four stone hawks and one in blue glazed pottery seem to refer to the worship of 'the Horus Seneferu,' as he is called in the inscription here.¹ The most interesting piece is the base of a statuette in hard black serpentine . . . dedicated to the gods of a town called Ded-Seneferu by a woman named Snefru-Khati. [This dates from the Twelfth Dynasty.] The lower part of a basalt stand was also found, in the courtyard." Petrie was of the opinion that the date of the latest graffito in the temple is the Eighteenth Dynasty, but M. Černý informs me (through Mr. Gunn) that apart from those of the

¹ Maspero [31 : VI, 70, 71] says the blue glazed hawk is similar to one from Giza bearing the name of Ahmose I of the Eleventh Dynasty.

Eighteenth Dynasty, apparently five of the graffiti belong to the Nineteenth Dynasty and at least one to the Twentieth. If this is the case, it may perhaps mean that we must revise the dating of the intrusive burial in the passage to at least the Twentieth Dynasty, for in view of the fact that the blocking in the door was found intact by Petrie, it is not likely that the latest graffito was made after the interment; we can scarcely imagine a visitor carefully replacing the stones after he had once removed them! It seems reasonable to believe, therefore, that the temple could not have been used as a habitation after the Twentieth Dynasty and it is probable, further, that it was not so used during the preceding two dynasties, since the veneration of the king was at that time greatly in vogue locally. We may now see whether or no it is possible to establish the approximate time when the shepherds lived in the temple. The statuette found in the passage shows that the temple was still used for sacerdotal purposes during the Twelfth Dynasty,¹ while the dung of the cattle, the fireplace, and so forth were found lying near the rock level outside the temple and immediately above the model offering dishes and jars of the Fourth Dynasty. Taking these finds into consideration, therefore, it seems that the temple was lived in by people some time in the period between its abandonment by the priests of the Fourth Dynasty and the beginning of the Twelfth Dynasty. From the fact that during the Fifth Dynasty, as we have already seen, various priests looked after the two pyramids of Seneferu; from the existence of the decree concerning Seneferu's two pyramid-towns issued by Pepi I of the Sixth Dynasty; and from the presence in the Meydûm temple of the two *Wenen-neferu* names of Seneferu of about the Sixth Dynasty — it may be assumed that the earliest date for the habitation was evidently the Sixth Dynasty. It possibly took place during the First Intermediate Period (Seventh to Tenth Dynasties), when the pyramid appears to have been first robbed and, perhaps, partly destroyed. That the silo remained more or less intact to the present day may be accounted for by assuming that not long after it ceased to be used by the early shepherds, it became gradually covered up by débris.

The temple [Plate XI] consists of a small building built against, but not bonded into, the east face of the pyramid; its outside base-measurements as shown in the elevations are 900 centimetres at the sides and 918 centimetres in front. Its maximum height, from the top of the foundation course to the top of the roof, is 270 centimetres. The exterior faces of the outer walls have a slight batter which improves the general appearance of the building. As will be seen from the plate, the masons never completed their work, for they left some of the lower courses undressed. On the roof is the incised emblem of the "Vigorous" quarry gang [Plate VI]. The walls were made of

¹ It doubtless continued to be so used until the intrusive burial was placed in the passage. Also, graffiti of the Twelfth and Thirteenth Dynasties were found in the temple [42 : I, 40; Plate XXXII, 2, 3, 4].

blocks of unequal heights which meant greater solidity for the temple when it was completed.¹ When finished, a mud-plaster floor was laid around the building and inside the passage and chamber at a height just sufficient to cover the tops of the foundation stones; the floor of the offering court was paved with stone. The temple is the oldest complete stone building of its kind in existence. In Plate IX will be found details of the earliest known use of stone in tombs, and so forth, from which we see that the first time the material was employed was for the floor of the tomb of King Udimu of the First Dynasty, which was made of granite. Next comes a reference in the Palermo Stone to a stone temple of a king who, Breasted [8 : 42] thinks, was Sendi, the last king of the Second Dynasty, and who Hall [77 : I, 276] thinks was king Nynether, also of the Second Dynasty. The reference in question, dated Year 13, reads: "Appearance of the King of Upper Egypt. Appearance of the King of Lower Egypt. [The temple called] 'The-Goddess-Abides' was built of stone" [7 : I, 64]. After this comes the limestone chamber of the tomb of Khā-sekhemui, the successor of Sendi, and the first king of the Third Dynasty. The most notable stone temple of the latter dynasty is of course that erected by king Zoser near his pyramid at Şaqqâra; it is now more or less in ruins.

The Meydûm temple consists of three main parts: the passage, a central chamber, and an offering-court. The passage leads from the entrance to the central chamber, which has a door in the west wall opening out in the small court containing two stelæ with a libation altar between them. The internal lengths and widths of the passage, chamber, and offering-court, as given below, are taken from the plan, which is made from the third course from the base, inasmuch as the lower courses are undressed.

(a) *The Passage.* In this passage, as we have already seen, Petrie found a statuette base of about the Twelfth Dynasty and a burial which he assigned to the Eighteenth Dynasty. Among other things in the sixty centimetres of blown sand covering the floor were some blue beads, bronze lance heads, and dried fruits, all from the same burial, and four hawks in stone and one in pottery. The outer doorway was carefully blocked after the burial had taken place. The passage, inside, is 600 centimetres long and 120 centimetres wide; its height from the floor to the ceiling is 228 centimetres, which is the same as the height of the chamber. The walls and ceiling of the passage are covered in places with the graffiti of visitors to the temple, the majority of which have been published by Petrie [42]. Two new graffiti were noticed by us: one, that of the son(?) of Seneferu-ānkh already referred to, and that of May(?), here illustrated in Plate XXXV, 1. As all the graffiti in the temple will be republished later by Mr. Gunn, we need not give further details

¹ See Somers Clarke and Engelbach [13 : 107, 108] for some valuable remarks concerning masonry of this type.

of them here. In passing, however, it may be stated that there are a few faintly scratched drawings of boats on the outside wall, to the left of the temple entrance, and also a crudely scratched figure of some animal on the ceiling of the entrance itself.

(b) *The Chamber.* The chamber, like the passage and the rest of the temple, is entirely bare and unadorned. It is 600 centimetres long and 193 centimetres wide at the south end and 198 centimetres at the north end. In addition to the graffiti published by Petrie, there are in this chamber three other scratched graffiti, one of which is as yet unreadable; this is on the west wall, to the left of the entrance to the offering-court. Of the other two, one of about the Twelfth Dynasty made by the scribe Hor(?)¹-em-sa-ef, is found to the right of this entrance; while the other, of about the Sixth Dynasty, mentioning, as we have said above, that the name of the Horus Seneferu . . . is Wenen-neferu, is on the east wall. There is also a crudely scratched boat on the east wall just to the right of the door leading to the entrance passage.

(c) *The Offering-court.* Unlike the passage and the chamber, which are roofed over, the offering-court is open to the sky. Its back wall is formed by the sloping base of the pyramid itself. It is 600 centimetres long, with a width from east to west at the floor level, of 239 centimetres. In the court are two great monolithic round-topped stelæ, 420 centimetres high, 100 centimetres broad, and 50 centimetres thick. They are of limestone and rest on low rectangular bases with sloping sides. The bases, which are 7 centimetres high, measure 164 centimetres in length and 114 centimetres in (average) width. The southern stela is 50 centimetres from the wall of the chamber, while the other stela, which seems to have subsided slightly, is 45 centimetres from the same wall. Between the stelæ is a small limestone altar for offerings, 142 centimetres long, 88 centimetres wide, and 50 centimetres high, while behind the altar itself must once have stood a great "false door", perhaps of granite, through which the deceased monarch was supposed to step forth from the pyramid in order to receive the offerings placed upon the altar. [See 9 : 74, and 77 : I, 337.] No trace whatever of this false door was found in the court, but parts of it may be discovered later, somewhere outside the temple. Petrie records [43 : 11, 12] having found a fragment of a royal stela near the small pyramid to the south of the king's pyramid; compare also the royal granite stela from the Meydûm village, the date of which is referred to in footnote 2 on page 11. The stelæ in the court are similar in shape to the two stelæ with rounded tops set up at Abydos in many of the royal tombs of the First and Second Dynasties, and to the double *heb-sed* (thirty-year festival) kiosks represented on stone fragments of the First Dynasty. Compare, for instance, the stelæ of Za-it¹ and Mer-neit,² and the kiosks of

¹ Mentioned and illustrated in 47 : 17; 62 : 184; see also Petrie's reference in *Royal Tombs*, I, 6.

² Mentioned and illustrated in 42 : 6, Frontispiece and Plate LXIV, 6.

Semerkhet-semsem¹ and Qaā-sen² of the First Dynasty; and also the stelæ of Sehkem-ib Per-en-Maāt³ of the Second Dynasty. Similar round-topped stelæ were found in the small chapel of the Fourth Dynasty ~~atabah~~ of Rā-hotep at Meydûm; for some reason or other these particular stelæ bore the name of prince Bu-nefer, who held the title "Concerned with the king's affairs."⁴ In the pyramid texts of kings Pepi I and Mer-en-Rā I of the Sixth Dynasty, paragraphs 1142, 1236, are shown other similar stelæ or boundary stones. [63 : II.] They also draw attention to the peculiar "obelisk" of Senwoseret I of the Twelfth Dynasty at Begîg in the Fayyûm, which is rounded at the top with a cylindrical curvature parallel with the wide face [47 : 165]. The two stelæ seem, in the later dynastic tombs of the Memphite period, to have been supplanted by two small obelisks. Maspero writes: "These two [small] obelisks belong to a class of monuments which are rarely found, except in tombs of the Memphite period (ending in the Eighth Dynasty). In their origin, the obelisks probably represented the two steles or stone columns, which were set on the right and left sides of the house-door of a king or personage of high rank, or of the temple of a god: it was a sort of ensign on which the name of the occupant was written. As the tomb was the dead man's dwelling house, it was natural that the same should be done for it that was done for his earthly habitation; and we therefore find, on the right and left of the stele, that is to say of the door which gave entrance to the vault, two small obelisks on which the name and titles of the owner were inscribed. This custom seems to have died out in the interval between the Memphite period and the first Theban Empire (commencing with the Eleventh Dynasty), at least in the case of private tombs, but the funeral vault of the Pahraoh Antufi Nubakhpîrriya of the Eleventh Dynasty, at Drah abu'l Neggah, had two limestone obelisks at the entrance. In later times, the employment of obelisks was confined to palaces and temple almost exclusively. In some few cases, nevertheless, probably owing to an archaistic fashion, private individuals set up obelisks in front of their tombs or villas."⁵ The obelisks themselves certainly had a solar significance; for instance, in paragraph 1178 of the Sixth Dynasty pyramid texts [63], we read that Pepi "is the guardian of these two obelisks of Rā which are on earth." As a matter of fact, an obelisk is really a pyramid on a long shaft, the apex or pyramidion representing the pyramid itself, the latter being the chief symbol of the god

¹ Mentioned and illustrated in 42 : 6, Plate VII, 5. Compare also Plate V, 2, of the present work and on the reading of the King's name see the note on Plate II.

² Mentioned and illustrated in 42 : 6, 26; Plate VIII, 7. See also Plate V, 3, of the present work.

³ Mentioned and illustrated in 43 : 33; Plate XXXI.

⁴ Mentioned and illustrated in 42 : 37, Plate XII, and 27 : 485, 486; in the latter wrongly attributed to tomb of Rā-nefer(?).

⁵ Maspero, 30 : 36, 37; see also Petrie, *Royal Tombs*, I, 6. Incidentally, Maspero suggests (pages 12, 81) that the idea of the rounded-top stela may have been derived from the appearance of a vaulted door. But compare also the kiosks shown in Plate V, 2, 3, of the present work.

Rā at Heliopolis, where there was preserved a pyramidal stone in the sun sanctuary [9 : 15, 70 ff.]. Incidentally, the bases of the Meydûm stelæ are like those of the obelisks represented in the early hieroglyphs. In concluding the account of the offering-court, it must be stated that with the exception of two incised hieroglyphs on the east face of the northern stela, evidently made by some passing scribe — one representing an owl (*m*) and the other a quail chick (*w*) — [Plate XXXVI, 1 and 2] — both the stelæ are plain and show no trace of any inscriptions.

The pyramid temple was, of course, the place in which the royal mortuary ritual was performed by the priests, who dedicated both it and the pyramid itself with magical formulæ for their protection. In the pyramid texts of king Pepi of the Sixth Dynasty the priest charged the pyramid to receive the deceased king: "When this king Pepi, together with his *ka*, comes, open thou thy arms to him!" At the same time the god Horus is supposed to say, "Offer this pyramid and this temple to king Pepi and to his *ka*." "Again," says Breasted [9 : 75-77], "the priest addresses the Sun-god under his earliest name, Atum (Itum), and recalls the time when the god sat high on the sacred *ben*, the pyramidal symbol at Heliopolis, and created the other gods. This then is a special reason why he should preserve the pyramid of the king forever. 'Thou wast lofty,' says the priest, 'on the height; thou didst shine as Phoenix of the *ben* in the Phoenix-hall in Heliopolis. . . . O Atum, put thou thy arms behind king Mernere (Mer-en-Rā), behind this building, and behind this pyramid, as a *ka*-arm, that the *ka* of king Mernere may be in it enduring forever and ever. Ho, Atum! Protect thou this king Mernere, this his pyramid and this building of king Mernere'. " Long after the original priests had left Meydûm, pious visitors entered the temple and placed their offerings upon the altar for the benefit of king Seneferu. Many of them have handed down their names to us in the graffiti on the temple walls.

B. *The Silo near Pyramid Temple*

Not far from the outer door and against the southeast corner of the pyramid temple we discovered a circular silo of bricks, 150 centimetres in diameter at the base [Plates XI and XXVII, 2]. It originally had a vaulted roof, and when found was 150 centimetres high. The bottom of the silo is 22 centimetres above the temple floor level and 64 centimetres above the rock level, and rests on small stones and débris. It must have been used by the shepherds who once inhabited the temple. Nothing came from the silo, but near it were several fragments of Fourth Dynasty jars and some model offering dishes.

C. *The Pyramid Causeway*

It is of course well known that each king's pyramid of the Ancient Empire had a causeway leading down from the pyramid-temple, or mortuary-temple,

to the temple in the valley below near the edge of the cultivation. But, whereas in all the other cases, the causeways have only been partially cleared, the causeway at Meydûm has been excavated by us for its entire length [Plate XII]. The causeway, which has been cut in the rock base of a sloping natural valley running slightly southeastwards from the pyramid (actually at an angle of $86^{\circ} 20'$ from the east face of the latter structure), consists of two parallel walls of stone with rounded tops. One of these coping stones was found in the causeway itself, lying on the floor [Plate XXXIV, 1]. This evidence indicates that the causeway was never roofed over, as is believed to have been the case with other causeways of the Ancient Empire. A bronze kohl stick was the only other object found in the causeway [Plate XV, 21]. The original height of the walls of the causeway was about 210 centimetres; owing to a small batter, they average 150 centimetres in thickness at the base and 128 centimetres at the extreme top, while the space between them — other than that at the extreme eastern end — varies between 295 centimetres and 310 centimetres. At the lowest part of the causeway near the cross brick walls, the intervening space is only 235 centimetres. The overall length of the sloping part of the causeway is 210.1 metres; between the west end of the slope and the east face of the peribolus wall of the pyramid is a distance of 445 centimetres. The peribolus wall itself is 140 centimetres thick, while between its west face and the front of the pyramid temple there is a space of 25.3 metres. Altogether, therefore, the lower end of the causeway is 241.25 metres from the entrance door of the pyramid temple. The floor of the causeway is made of a layer of mud-plaster, about 8 centimetres average thickness, and is 14.9 metres lower at the east end than at the west end near the peribolus wall. We found no traces of a path between the peribolus entrance and the temple entrance, but, as there certainly were signs of a floor of mud-plaster to the east of the temple, it is probable that the area inside the peribolus wall was originally covered with that material. At the upper end of the causeway itself is a small door opening out on its north side and another similar door opening out on its south side. Further on, and between the peribolus wall and these side doors, are two small chambers, one on either side of the path which leads straight along westwards from the causeway top to the peribolus wall entrance, which is roughly opposite the door of the pyramid temple. In each of these chambers doubtless once stood a statue of the king himself. Some peculiar holes in the rock below the floor of the northern chamber are shown in Plate XXXIII, 2. At a distance of about three metres west of the lower end of the causeway, there is an offset on either side, and against each offset a door-socket of limestone which once held the pivot of one of the leaves of the great double door of wood which was fixed at this point. In this connection, one is reminded of the mention in the Palermo Stone of the making of the cedar-wood doors of Seneferu's palace

[7 : I, 66], the wood for which came from the Lebanons. At the east end of the causeway, Petrie found traces of a great brick wall running at right angles to the south, while we found another similar wall running at right angles to the north. These walls must be parts of those which enclosed the pyramid area during the Fourth Dynasty. Similar enclosing walls are known at Gîza and elsewhere. It is at some place to the east of these walls and below the cultivated Nile deposits that the remains of the valley temple must lie [Plate I], but the work of searching for them was held over until the next season so that the necessary pumps could be obtained to remove the water which covers the buildings at this part of the site. A certain amount of sand, however, has already been removed from this area.

Not far west of the lower end of the causeway and about two metres above its southern wall was a furnace of bricks used for smelting metals [Plates XIII; XXXIV, 2]. Several pieces of slag were lying in it and were submitted to the authorities of the Cairo Museum for analysis. The furnace had a small opening on its north side, and was certainly built much later than the causeway, but there was no evidence to fix its date. On the desert surface a little to the southwest of the furnace was found a limestone fragment from a private tomb of the Ancient Empire; this bears the words "with him by," and the sentence to which it belonged is evidently to be reconstructed somewhat as follows: ["As for any man who damages this tomb, I will be judged] with him by [the Great God"]. [Plate XXXVII, 1.]

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DESCRIPTION OF PLATES

PLATE I. Reconstruction of the Meydûm Pyramid Site, looking northwest and showing Seneferu's pyramid, parts of the mastabah tomb of, perhaps, the queen; and of the mastabah of a member of the royal family, perhaps a princess; the Pyramid Temple, Enclosing Wall, and Causeway. The Valley Temple at Meydûm has not yet been found but is here restored after that of Khâ-ef-Râ at Gîza. On the right front of the pyramid is the large brick mastabah, Number 17, doubtless belonging to a member of the royal family, and the smaller mastabah, 293, is shown near by. Constructional ramps for both Mastabah 17 and the pyramid itself are shown; the latter originally extended to the top of the pyramid. Drawing by I. Reich.

PLATE II. The Meydûm Pyramid and Mastabah 17 before the outer casings were added. In this drawing, looking from the southwest, the constructional ramps are not shown.

PLATE III. Plan and section of the Meydûm Pyramid and its surroundings. Restored from details published by Petrie, with modifications by the Coxe Expedition.

PLATE IV. Plan and sections showing stages in construction of the Meydûm Pyramid. Adapted by permission from Borchardt.

PLATE V. Details of staged and similar buildings from the First to the Sixth Dynasty. The numbers of the Pyramid Texts are from Sethe [63]; for Number 1 see Petrie [47 : I, 22]; for 2, [50 : I, Plate VII, 5]; for 3, [50 : I, Plate VIII, 7]; and for Numbers 4 to 7 see Plate IX of the present article.

PLATE VI. Quarrymen's Gang Names on Fourth Dynasty Stones at Meydûm. Numbers 1 to 6 and 10 to 16 were found in loose limestone blocks in the débris against the pyramid's sides. Numbers 7 and 8 are from blocks *in situ* in the tunnel made by Petrie under the east side of the pyramid; 7 was on the right side, 8 on the left side of the tunnel [see 43 : Plate V, 8]. Numbers 10, 11, and 12 were also found on blocks in the great western tombs.

The stone on which Number 3 appears has also the name of the "Vigorous" gang.

Number 8 has the word *sethes* superimposed [see 43 : Plate V, 7, 8]. Number 9 is on the roof of the Pyramid Temple [see Plate XI, 2, and Plate XXXVIII, 1]. Number 13 has two signs for "north" [compare Numbers 14 and 15, and Plate XIV, 24].

Number 16 is hardly *âperw*, "gang" [see Plate XXXVI, 3]. All signs are in red paint, except Number 9, which is incised.

PLATE VII. Map of Egypt showing relative position of Meydûm and other pyramid sites of the Ancient and Middle Empires, about 3000-1800 B. C.

PLATE VIII. Composite map of Meydûm before 1929-30 excavations of the Coxe Expedition. Prepared by the staff of the Coxe Expedition after Petrie [42; 43; 44] and Borchardt [6]. The immense tomb three furlongs northwest of the pyramid and not yet excavated has been numbered 200 by us.

PLATE IX. The Meydûm Pyramid compared with the other royal tombs of Egypt, arranged chronologically. After Vyse and Perring, Petrie, Reisner, and Barsanti [compare Plates XVI-XXI].

PLATE X. Plan and section of Pyramid Passage and Chambers. The ancient level lines are self-explanatory. The hieroglyphs give the name of Seneferu's southern pyramid. See description in Section IV and photograph in Plate XVIII, 1.

PLATE XI. Plans, sections, and elevations of the Pyramid Temple. See description in Section V and compare Plates XXVI-XXX. The plan of the Pyramid Temple (Number 1) is made at the third course from the base as lower courses are undressed. Number 2 is a plan of the roofing and coping stones with the name of the temple written as found on a hieratic graffito of the Eighteenth Dynasty in the temple passage. Number 3 is a front elevation of the temple; Number 4, elevation of the south side; Number 5, an east to west section through A-B, looking north; and Number 6 a north to south section through C-D looking east. Number 7 is an east to west section through E-F of the later site found near the Pyramid Temple.

PLATE XII. Plans and section of the Pyramid Causeway. See description, Section V. Number 1 is section west to east through A-B, looking north; Number 2, plan; Number 3, enlarged plan of west end of causeway at Pyramid Temple; Number 4, enlarged plan of east end at Valley Temple; Number 5, south to north section, through E-H, of west end of causeway looking west; Number 6, south to north section, through C-D, at centre of causeway, looking west; the tops of the walls being restored after a coping stone found in the causeway [see Plate XXXIV, 1]; Number 7 is a south to north section through K-L of east end of causeway, looking west; Number 8, west to east section, through E-F of west end of causeway, looking north; Number 9, west to east section, through I-J of east end of causeway, looking north.

PLATE XIII. Brick furnace, situated two metres above the south wall of the east end of the Pyramid Causeway, is made entirely of brick; some lumps of slag were found in it. Date uncertain. [See Plate XXXIV, 2.]

DESCRIPTION OF PLATES

PLATE XIV. Objects from débris against the west and north faces of the pyramid. Numbers 1 to 16 found against the west face; Numbers 17 to 24, against north face. Numbers 1 to 3, 5, 6, wood combs with incised decoration; Number 4, plain comb; Numbers 7 and 8, wood hoe-blades; the notches and holes are for connecting cords [see Petrie, *Tools and Weapons*, Plate LXVIII, 58, 62, and others]. Number 9, wood kohl-stick; Number 10, red-brown pottery jar-handle, with incised signs; Numbers 11, 12, and 18, blue faience sacred eye amulets, with plain backs, pierced; Number 20, same, dark green faience, found on skull of baby; Number 13, faience scarab, pierced, bearded lion with uræus, emblematic of the king. [See Petrie, *Riqqeh and Memphis*, Plate XVIII, 117, Nineteenth to Twenty-fourth Dynasties.] Number 14, rosette, black stone, white inlays, yellow centre. Number 15, faience scaraboid, incised on both sides, pierced. Number 16, wood implement, use uncertain.

Number 17, wood Ānkh emblem, perhaps from side of chair or from coffin. Number 19, red pottery lamp, black slip, Hellenistic about 500–200 B. C. See *British Museum Catalogue of Lamps*, page 40, Number 282, also from Egypt. Number 21, wood spindle; Number 22 and 23, bronze arrow-heads. Number 24, limestone block from above pyramid passage entrance, emblems of the “North” quarry gang and so forth painted in red; the three signs on the left are incised [see Plates VI and XXXVIII, 1].

PLATE XV. Objects from débris against the east face of the pyramid, in pyramid passage, near pyramid temple, causeway and east peribolous wall. Numbers 1 to 9 found in débris against the east face: Number 1, limestone weight for drill, used as shown in Number 2, a temple scene of the Fifth Dynasty from Abusîr, with a man drilling out a stone vase. See Clarke and Engelbach [3 : 203]. Number 3, pale blue steatite scarab, half missing, pierced. Number 4, light blue faience seal, pierced; on one side cartouche of Sheshonk IV, Twenty-second Dynasty; other side, sacred eye with pupil and three crocodiles in centre. Amulets with figures of crocodiles enabled their owners to overcome the bites of evil influence of the reptiles. Number 5, bronze arrowhead; Number 6, wood spindle-whorl; Number 7, red-brown pottery three-handled jar; Number 8, wood hoe-blade with original cords. Number 9, white alabaster vase, in the shape of a hippopotamus, head and legs missing; this perhaps represents “The White One,” a hippopotamus goddess of the Fayyûm [see 81 : III, 212].

Numbers 10 to 16, from the débris in the pyramid passage; Number 10, red-brown pottery model offering pot, mouth missing, Fourth Dynasty; Number 11, red-brown pottery model offering dish, upper part missing, Fourth Dynasty. Numbers 12, 13, and 14, jar-necks with strainers, of buff pottery with darker slip; Number 12 has two incised lines under ridge,

Number 13 has traces of lines; Iron Age, apparently of foreign, perhaps Cypriote, origin. Number 15, red-brown potsherd, Fourth Dynasty. Number 16, shell, used for cosmetics.

Numbers 17 to 20, 22, from débris east of and near pyramid temple; Number 17, crystal bead, bored from ends; Number 18, bronze disc, perhaps part of a pendant; Number 19, blue faience scaraboid, plain, pierced; Number 20, wood fragment, perhaps base of statuette; Number 22, two-handled red pottery jar, with darker slip, contained mummy of baby. Number 23, two-handled, red-brown pottery jar, contained bones of a baby (Burial Number 243); Number 24, two-handled, red-brown pottery jar, contained bones of a baby (Burial Number 249).

PLATE XVI. The Meydûm Pyramid before the 1929-30 excavations were begun.

Figure 1. Southwest angle.

Figure 2. Southeast angle.

PLATE XVII. The Meydûm Pyramid.

Figure 1. Northwest angle, taken after the commencement of excavations.

Figure 2. Northeast angle, taken before excavations were begun; the entrance is visible on the right side; the débris in the foreground are from the west side of Mastabah 17.

PLATE XVIII. The Meydûm Pyramid.

Figure 1. North side, looking southeast. A marks the casing of the 8-story constructional stage; B, the casing of the 7-story stage; C, the platform of the former stage; D, the core of the outer sloping casing. The section in Plate X runs through this part of the pyramid.

Figure 2. West side, looking southwest. A marks the casing of the 8-story stage; B, the casing of the 7-story stage; and C, the core of the outer sloping casing.

PLATE XIX. The Meydûm Pyramid.

Figure 1. South side looking southwest. A marks the casing of the 8-story stage; B, the casing of the 7-story stage; and C, the core of the outer sloping casing.

Figure 2. East side, looking west. A marks the casing of the 7-story stage, and B, the roughly dressed core-stones of the 8-story stage; these stones rest upon a platform of the former stage.

PLATE XX. The Meydûm Pyramid.

Figure 1. North side looking south. A marks the part of pyramid shown in Figure 2.

DESCRIPTION OF PLATES

Figure 2. North side looking southwest. A marks the stones over the entrance passage, see section in Plate X, which runs through this part of the pyramid; B marks the face of the outer sloping casing; C, the core of the outer sloping casing; D, the casing of the 8-story stage; and E, the platform of the stage, seen also in Plate XVIII, 1, there marked C, and in Plate XXII, 1, marked D.

PLATE XXI. The Meydûm Pyramid.

Figure 1. North side, looking southwest; a close-up of the lower part of the casing shown in Plate XX, 1.

Figure 2. Model of the pyramid. This was made prior to the present excavations and hence certain details do not agree with those on later plans. The model shows the pyramid temple, the head of the causeway, the smaller pyramid on the left, perhaps of the queen, and on the right the mastabah tomb of a member of the royal family. The structures are inclosed by the peribolous wall. Model by Miss M. Bentwich.

PLATE XXII. The Meydûm Pyramid.

Figure 1. The pyramid entrance. Looking southeast. D refers to the same point as D in Plate XX, 2; X marks débris lying against the side of the Pyramid.

Figure 2. The pyramid passage, looking south and down to the first ante-chamber; compare the section on Plate X.

PLATE XXIII. The Meydûm Pyramid.

Figure 1. First ante-chamber, looking northeast from entrance to second ante-chamber; in left background can be seen the end of the descending passage.

Figure 2. Second ante-chamber, looking southwest from inner entrance of first ante-chamber; the bottom of the shaft leading up to sarcophagus chamber is seen in the left background.

PLATE XXIV. The Meydûm Pyramid.

Figure 1. Passage from the second ante-chamber to bottom of shaft ascending to the sarcophagus chamber; looking south; the ladder is modern.

Figure 2. The Queen of the Belgians about to enter the pyramid, on March 31, 1930. The Queen is attended by Sadik Pasha Wahabi, representing His Majesty King Fuad of Egypt, by M. Capart, Director of Les Musées Royaux Cinquantenaire, Brussels, and by the present writer. The pyramid was lit by electric light for the occasion.

PLATE XXV. The Meydûm Pyramid.

Figure 1. Upper part of the north end of the sarcophagus chamber.

Figure 2. Lower part of the north end of the sarcophagus chamber.

In both figures, the ancient wood beams and slots for beams can be seen; these were probably used for hauling objects up to the chamber. Maspero, who opened the pyramid in 1881-1882, writes: "An apparatus of beams and ropes still in place above the orifice shows that the robbers took the sarcophagus out of the chamber back in antiquity." [*L'Archeologie Egyptienne*, page 143.] The top of the shaft with the upper end of a modern ladder is seen in the right lower corner.

PLATE XXVI. The Pyramid Temple.

Figure 1. Front view, looking west, showing entrance door; the tops of the two great stelæ can be seen projecting above the roof. [Compare Plate XXVII, 1, and Plate XI.]

Figure 2. Detail of the roof; see also the plan of the roof in Plate XI.

PLATE XXVII. The Pyramid Temple.

Figure 1. The temple courtyard with stelæ and altar. The door opening into the inner chamber can be seen behind the stelæ; in front of the altar in the left foreground there originally stood a great false door, but no traces of it have been found. Looking northeast. See Plate XXXVI for inscriptions on one of these.

Figure 2. The temple and the silo; looking northwest. Plan of silo in Plate XI.

PLATE XXVIII. The Pyramid Temple.

Figure 1. South end of entrance passage, looking south. The wall to the right is covered with hieratic graffiti, shown in Plate XXXV, 1, 2.

Figure 2. North end of entrance passage, looking north, with door leading to inner chamber.

PLATE XXIX. The Pyramid Temple.

Figure 1. Southern end of inner chamber, looking south.

Figure 2. Northern end of inner chamber, looking north.

This inner chamber contains a few scratched graffiti, two of which mention the name of Seneferu.

PLATE XXX. The Pyramid Temple.

Figure 1. Foundations of the outer east wall with the entrance in the center.

Figure 2. Libation altar in the courtyard, with base of the pyramid in the background.

PLATE XXXI. The Causeway. Compare the plans in Plate XII.

Figure 1. Looking southeast and showing pyramid temple.

Figure 2. Looking west, with pyramid in background; the pool of water partly covers the site of the valley temple, not yet excavated.

DESCRIPTION OF PLATES

PLATE XXXII. The Causeway. In both figures, A marks the upper part of the Causeway; B, the side doors; C, the small chambers which once may have held statues; and D, the peribolous wall.

Figure 1. South side of upper end, looking south. The top of the Fourth Dynasty tomb can be seen beyond the peribolous wall.

Figure 2. North side of upper end, looking north. E marks the entrance in the peribolous wall leading to the temple; in the rock below the statue-chamber are seen the two holes shown in Plate XXXIII, 2.

PLATE XXXIII. The Causeway.

Figure 1. Details of foundations of double door at valley temple end. See Plate XII for plans.

Figure 2. Holes in the rock below the floor of the north statue-chamber.

PLATE XXXIV. The Causeway.

Figure 1. Coping stone of causeway wall. The dimensions of the stone are: length, 130 centimetres; maximum height, 50 centimetres; maximum thickness, 42 centimetres. It was found on the causeway floor near the western end. Compare the restored section of the wall on Plate XII, 6.

Figure 2. Brick furnace containing slag, found above the south wall at the lower end of the causeway. The furnace was obviously built later than the causeway, but its actual date is uncertain. See Plate XIII for plan and section.

PLATE XXXV. Various inscriptions.

Figure 1. Hieratic graffiti in black ink on west wall of passage. The name under the hawk appears to read Mey (ꜥ). The text on the left (above the seated figure and solar disk) reads, according to Mr. Gunn, "The jeweller (ꜥ), Ter." Date, according to M. Černý, Nineteenth Dynasty. See 42 : Plate XXXIV, 11, page 41.

Figure 2. Hieratic graffiti in black ink on west wall of passage, dated in the year 30 of Amenophis III. The text reads: "Regnal-year 30 under the majesty of the king of the South and North Neb-Maât-Rā, son of Rā, Amenophis, ruler of Thebes; may he live forever as a beneficent king in the whole of this land! The scribe Mey came to see this very great pyramid of the Horus . . . Seneferu . . ." (Adapted from Mr. Gunn's translation.) See 42 : Plate XXXVI, 17, page 41.

PLATE XXXVI. Various inscriptions.

Figure 1. The character *w* (quail chick) incised on stela in temple courtyard, shown in Plate XXVII, 1.

Figure 2. The character *m* (owl) on the stela.

Figure 3. Emblem of the "Sound" quarry gang, found in débris.

PLATE XXXVII. Various inscriptions.

Figure 1. Fragment of a private stela of an early dynasty, found near temple.

Figure 2. Bread stamp(?) with corrupt text in Greek characters (Coptic?), found in débris.

Figure 3. Architect's sketch in black paint on limestone fragment, found in débris.

PLATE XXXVIII. Various inscriptions.

Figure 1. Emblem of the "Vigorous" quarry gang on temple roof.

Figure 2. Quarrymen's inscriptions on stone from débris. The whole text reads: "Year 16, month 4 of inundation season (*akhet*), day 14."

Figure 3. Architect's sketch in black paint from area southwest of pyramid.

PLATE XXXIX. Various inscriptions.

Figure 1. Hieratic graffito in black ink on ceiling of the entrance passage. This reads: "The scribe Sekri." Nineteenth Dynasty, according to M. Černý. See 31 : I, 149, 150; and 39 : XXVII, 102, 103.

Figure 2. Hieratic graffiti in black ink on ceiling of the entrance passage. They read: (A) "The scribe Amen-mes"; (B) "The scribe Amen-mes came." First half of Nineteenth Dynasty, according to M. Černý. See 31 : IV, 127, 128, footnote 4.

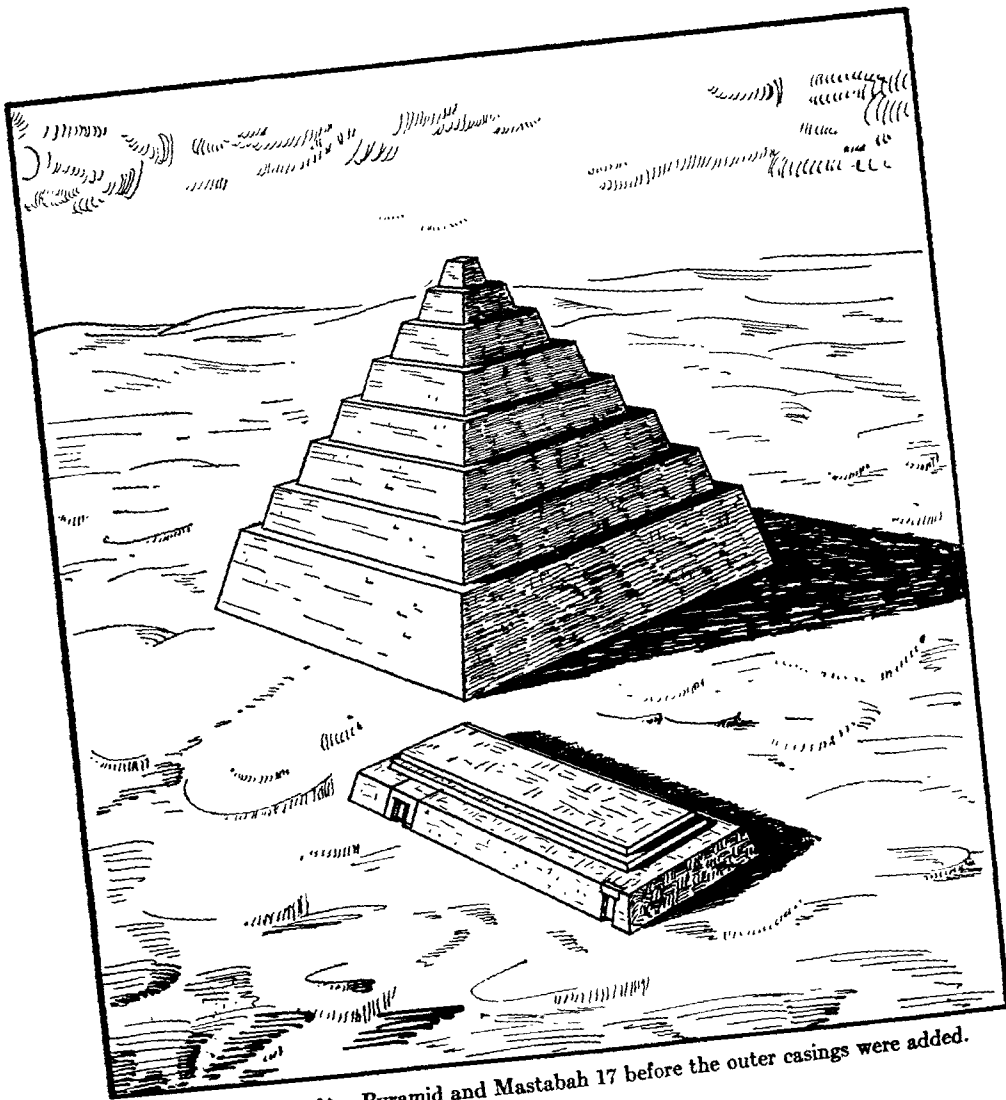


PLATE II.—The Meydûm Pyramid and Mastabah 17 before the outer casings were added.

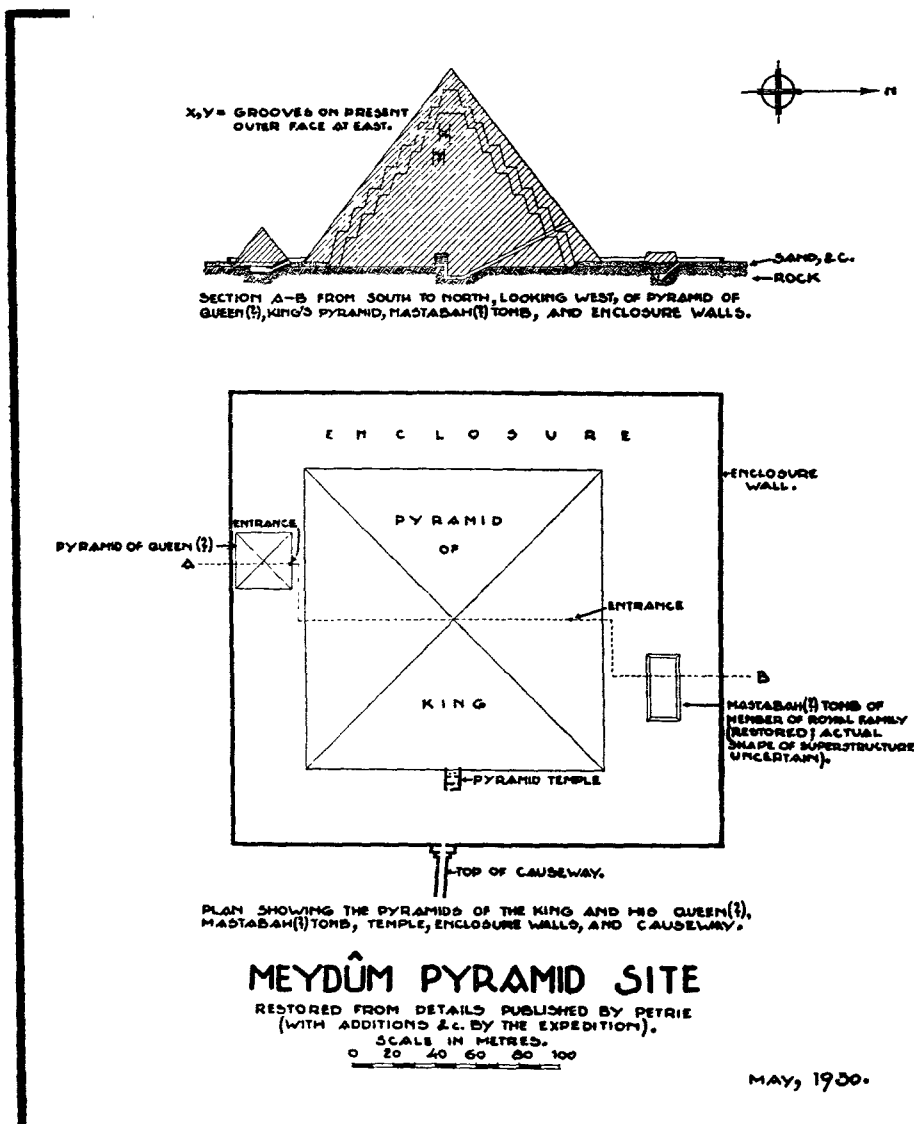


PLATE III.—Plan and Section of the Meydûm Pyramid (Restored) and its surroundings.

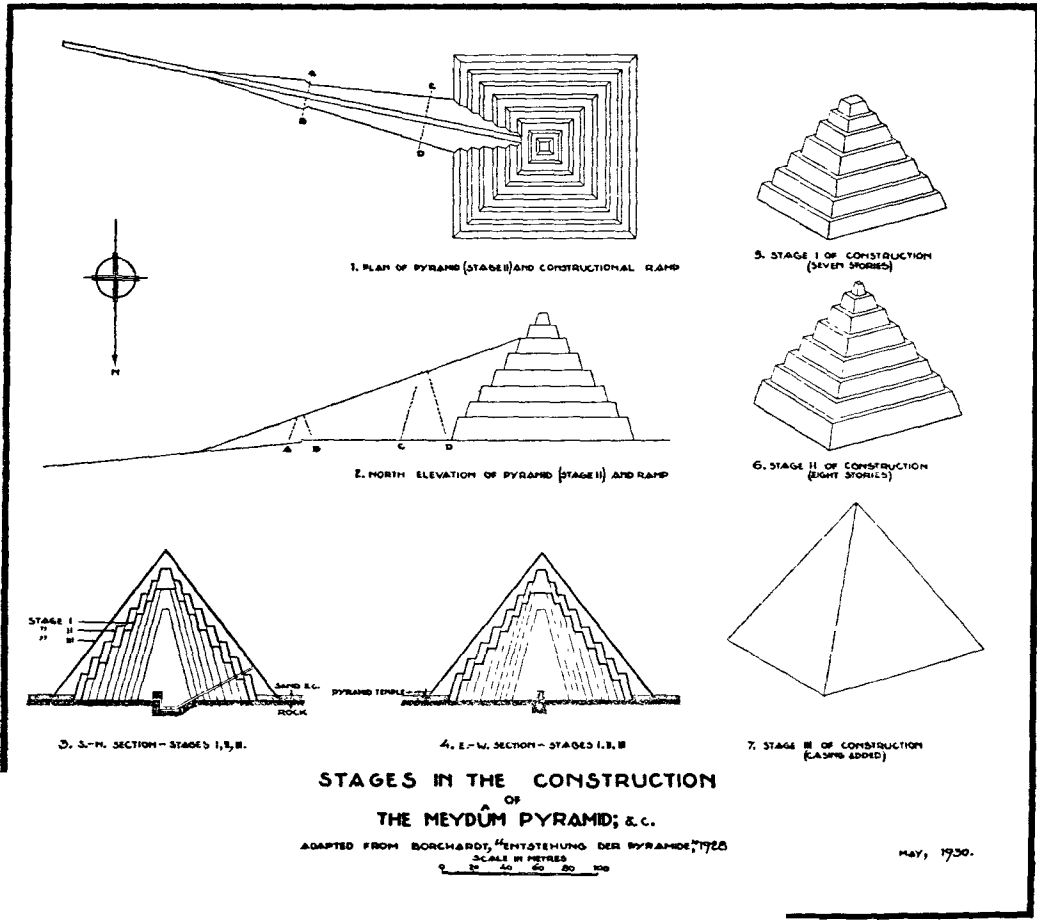


PLATE IV.—Plan and sections showing stages in construction of the Mejdum Pyramid.

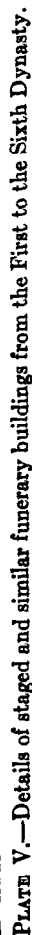
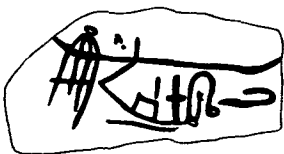


PLATE V.—Details of staged and similar funerary buildings from the First to the Sixth Dynasty.



1-7. "STEPPED-PYRAMID" GANG.
MR(?).



8. "BOAT" GANG.
WORD - VALUE UNCERTAIN.



9. "VIGOROUS" GANG.
WJD.



10. "SCEPTRE" GANG.
WJS.



11, 12. "ENDURING" GANG.
DD.



13.



14.

13, 14, 15. "NORTH" GANG.
MYW.



15.

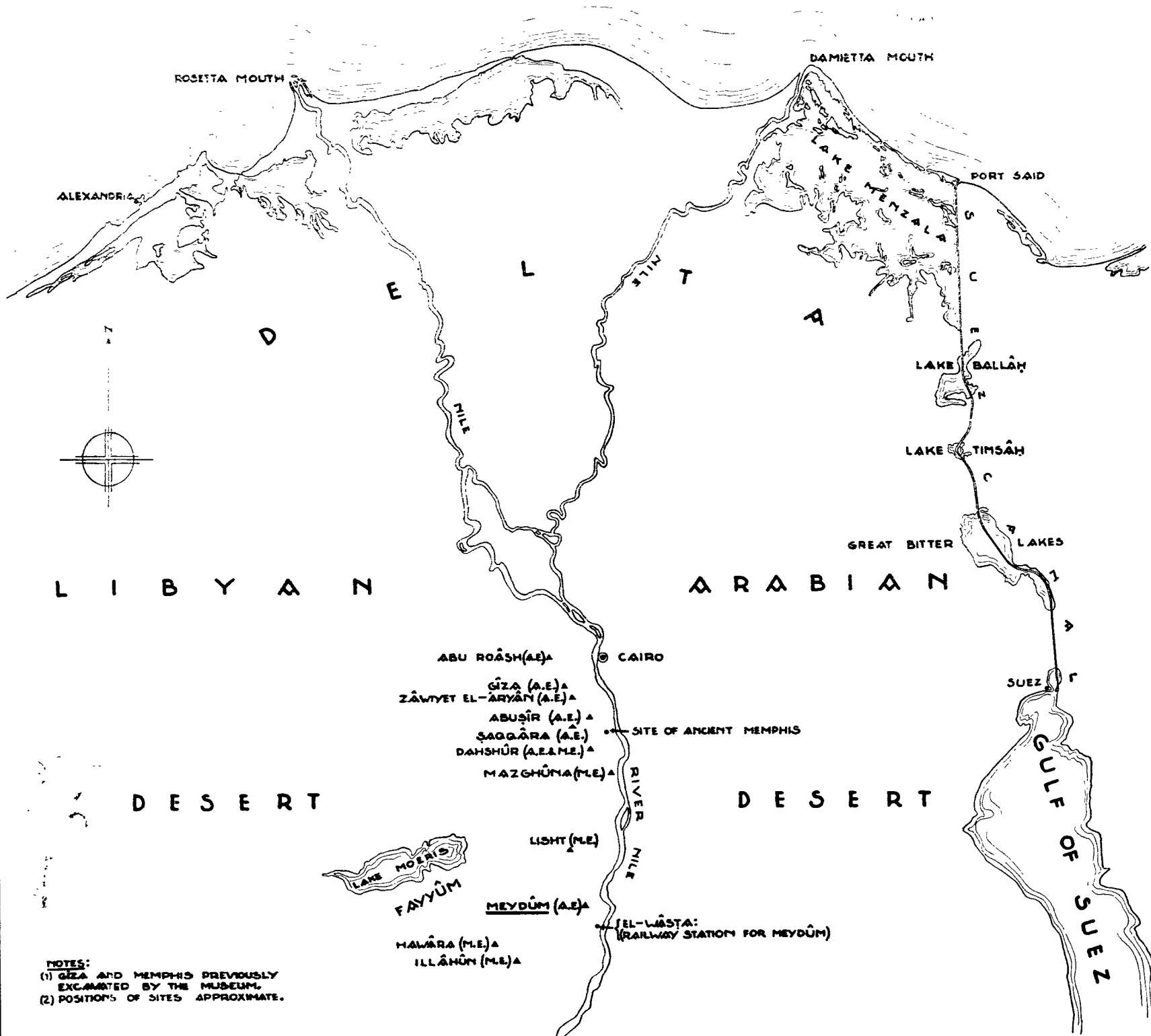


16. "SOUND" (WD).
GANG-NAME(?)

QUARRYMEN'S GANG-NAMES ON IVTH. DYNASTY STONES AT MEYDÛM. NOT TO SCALE.

PLATE VI.—Quarrymen's Gang Names on Fourth Dynasty Stones at Meydûm.

M E D I T E R R A N E A N S E A



NOTES:
(1) GIZA AND MEMPHIS PREVIOUSLY EXCAVATED BY THE MUSEUM.
(2) POSITIONS OF SITES APPROXIMATE.

MAP OF NORTHERN AND MIDDLE EGYPT SHOWING THE RELATIVE POSITIONS OF

MEYDÛM AND OTHER PYRAMID SITES
DATING TO THE ANCIENT AND MIDDLE EMPIRES
C. 3000 — C. 1800 B.C.

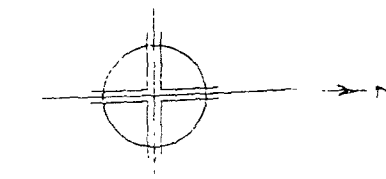
▲ PYRAMID SITES
A.E. (ANCIENT EMPIRE
C. 3000 — C. 2100 B.C.)
M.E. (MIDDLE EMPIRE
C. 2100 — C. 1800 B.C.)

SCALE: MILES
10 5 0 10 20 30 40 50 60

MAY, 1930

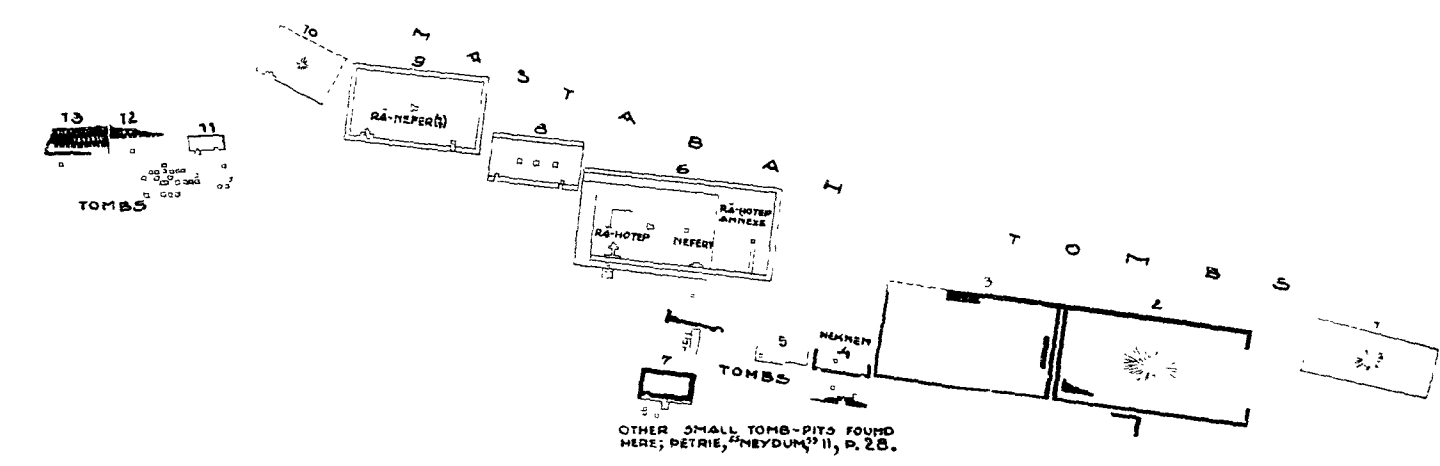
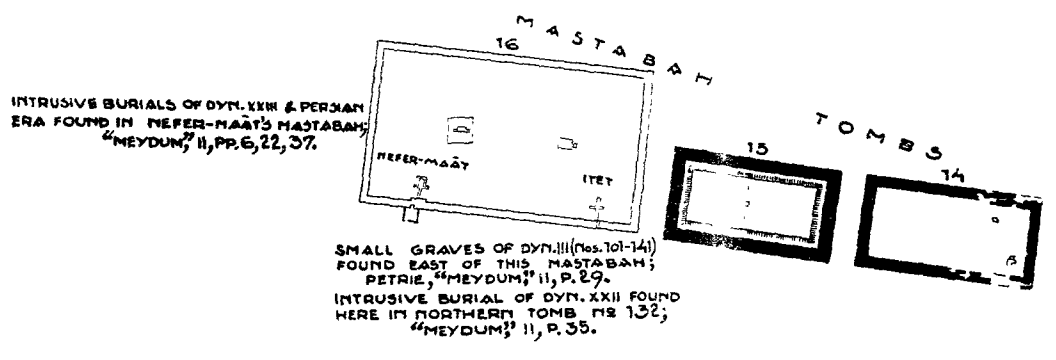
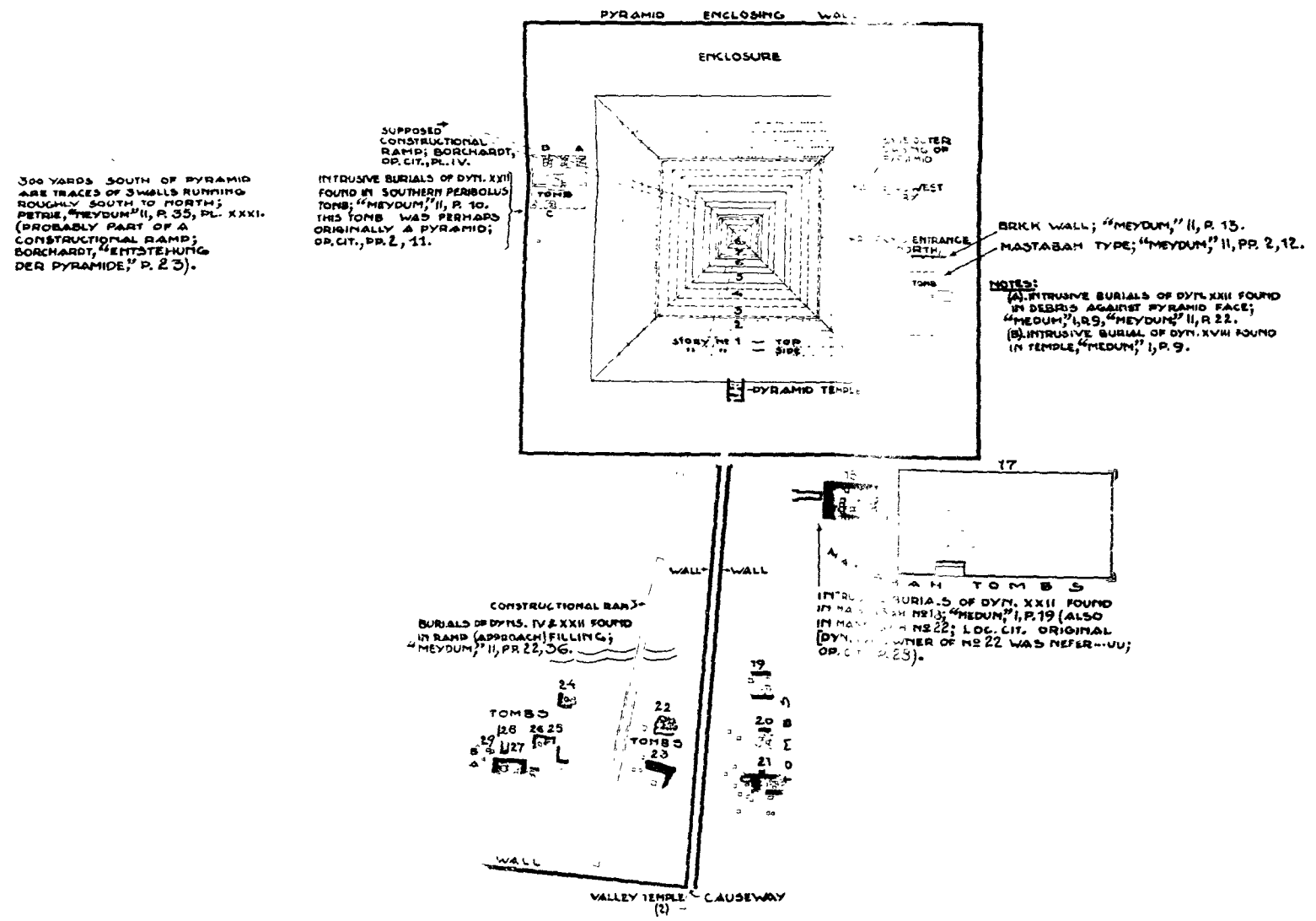
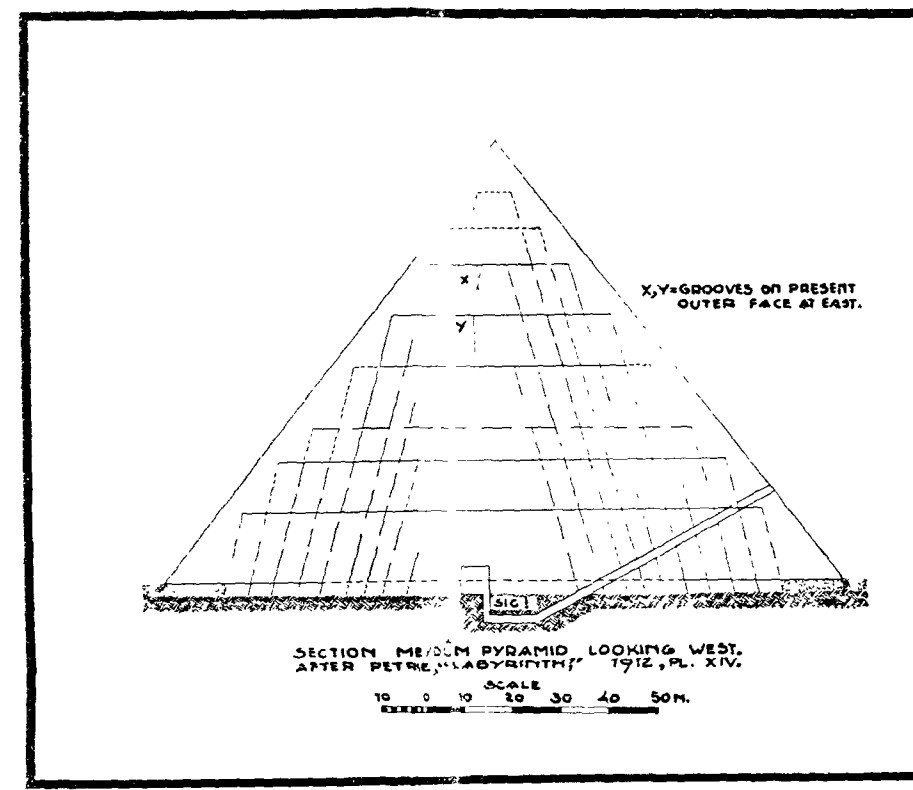
FOR WESTERN TOMBS
(50-84)
INTRUSIVE BURIALS OF DYN. XXII FOUND
IN THESE TOMBS: MEYDUM I, P. 19.

IMMENSE TOMB OF "NEAR WESTERN" TYPE FOUND
3 FURLONGS N.W. OF PYRAMID NOT EXCAVATED (MEYDUM I, P. 5).
(MS. 200 OF THE 1929-1930 SEASON; NOT YET EXCAVATED).



INTRUSIVE BURIALS OF DYN. XXIV-XXV
FOUND HERE: MEYDUM I, P. 19.
NEAR WESTERN TOMBS
INTRUSIVE BURIALS OF DYN. XXII FOUND
IN THESE TOMBS: MEYDUM I, P. 5, 14.

D E (P L A T E A U) R



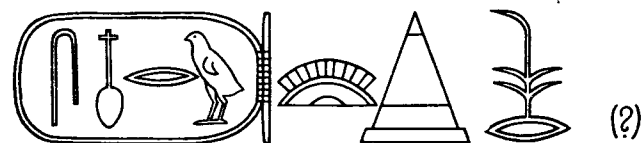
NOTES:
(A) THIS MAP DOES NOT SHOW CERTAIN ALTERATIONS IN
DETAILS RESULTING FROM THE 1929-1930 EXCAVATIONS;
SUCH ALTERATIONS ARE SHOWN ON PL. 4.
(B) ALL TOMBS (INCLUDING THOSE IN WHICH LATER INTRUSIVE BURIALS
WERE MADE) ARE OF DYN. IV, EXCEPT WHERE OTHERWISE INDICATED.
(C) AS WE REGARD JUFERU AS THE FIRST KING OF DYN. IV, AND
NOT AS THE LAST KING OF DYN. III AS PETRIE DOES, THE TOMBS
DATING TO JUFERU'S TIME AND RECORDED BY PETRIE AS "DYN. III TOMBS"
MUST THEREFORE BE CONSIDERED AS BELONGING TO DYN. IV.
(D) AN INTRUSIVE BURIAL IN TOMB 31-LOCATION NOT GIVEN-
DATED TO DYN. XVIII; MEYDUM I, P. 36.

UNDERGROUND OR CONCEALED MASONRY
RESTORED MASONRY AND BRICKS
EXISTING MASONRY AND BRICKS

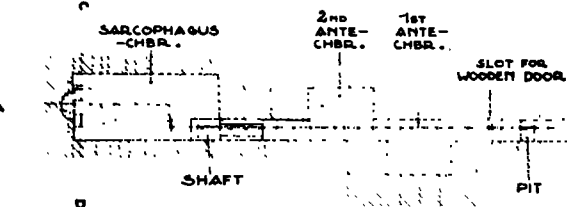
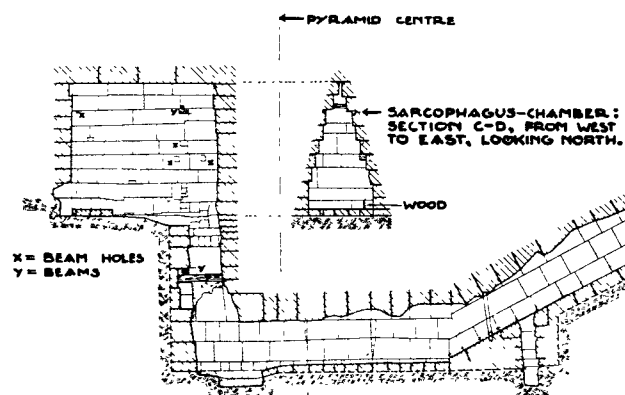
COMPOSITE MAP OF MEJDUM PRIOR TO THE EXCAVATIONS OF 1929-1930
PREPARED FROM THE WORKS OF PETRIE, BORCHARDT, ETC.,

SCALE
0 20 40 60 80 100 M.

JULY, 1929.



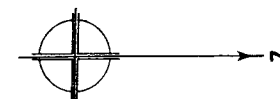
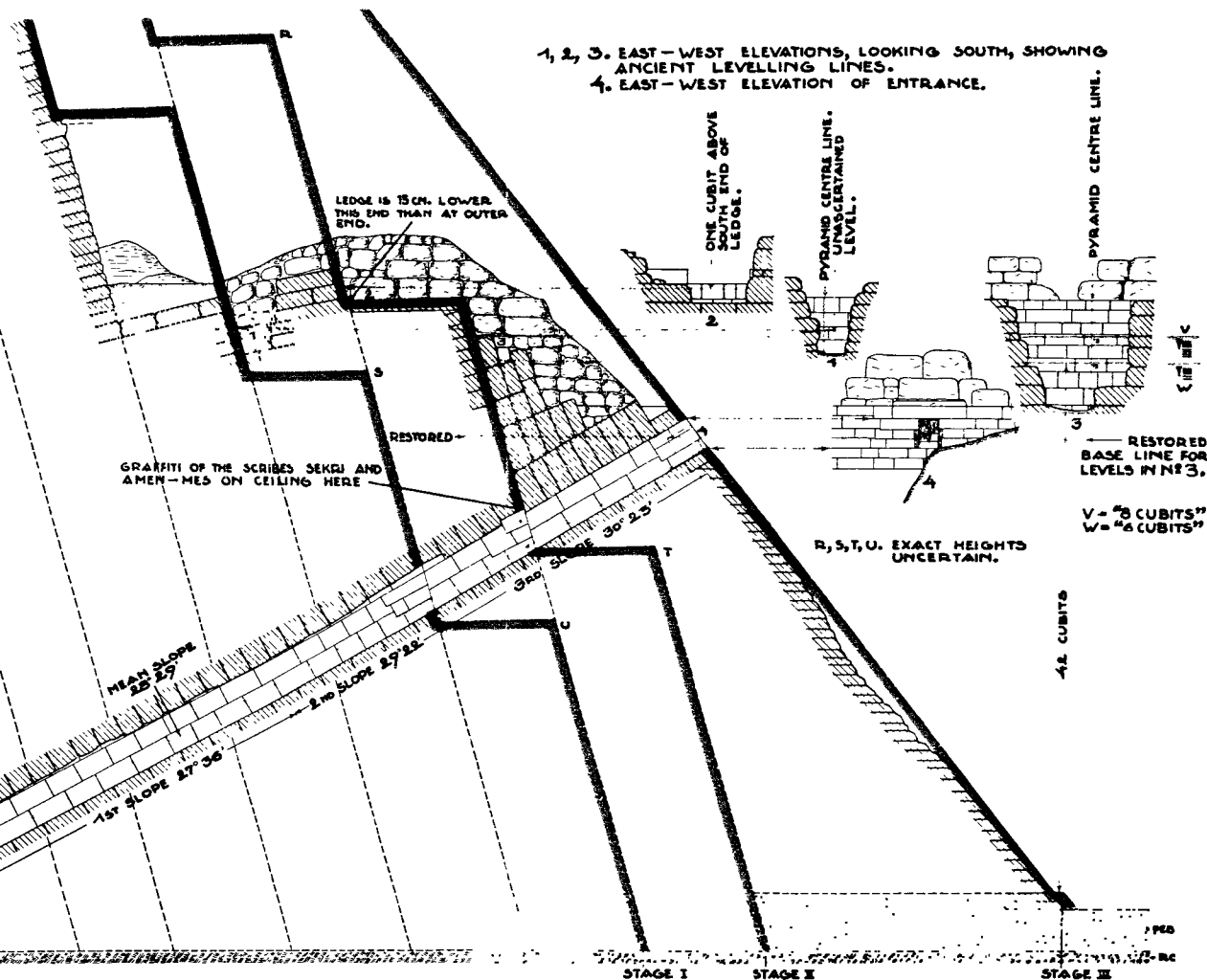
"THE SOUTHERN PYRAMID, 'SENEFERU' — APPEARS."



ROCK IN PLAN AND ELEVATION.

MEYDÛM PYRAMID.—ENTRANCE-PASSAGE AND CHAMBERS.

SCALE 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 METRES



CONSTRUCTIONAL		
STAGE I (7 STORIES)	STAGE II (8 STORIES)	STAGE III (SLOPING CASINO)
S=SLOTS IN WALLS		

MAY, 1930.

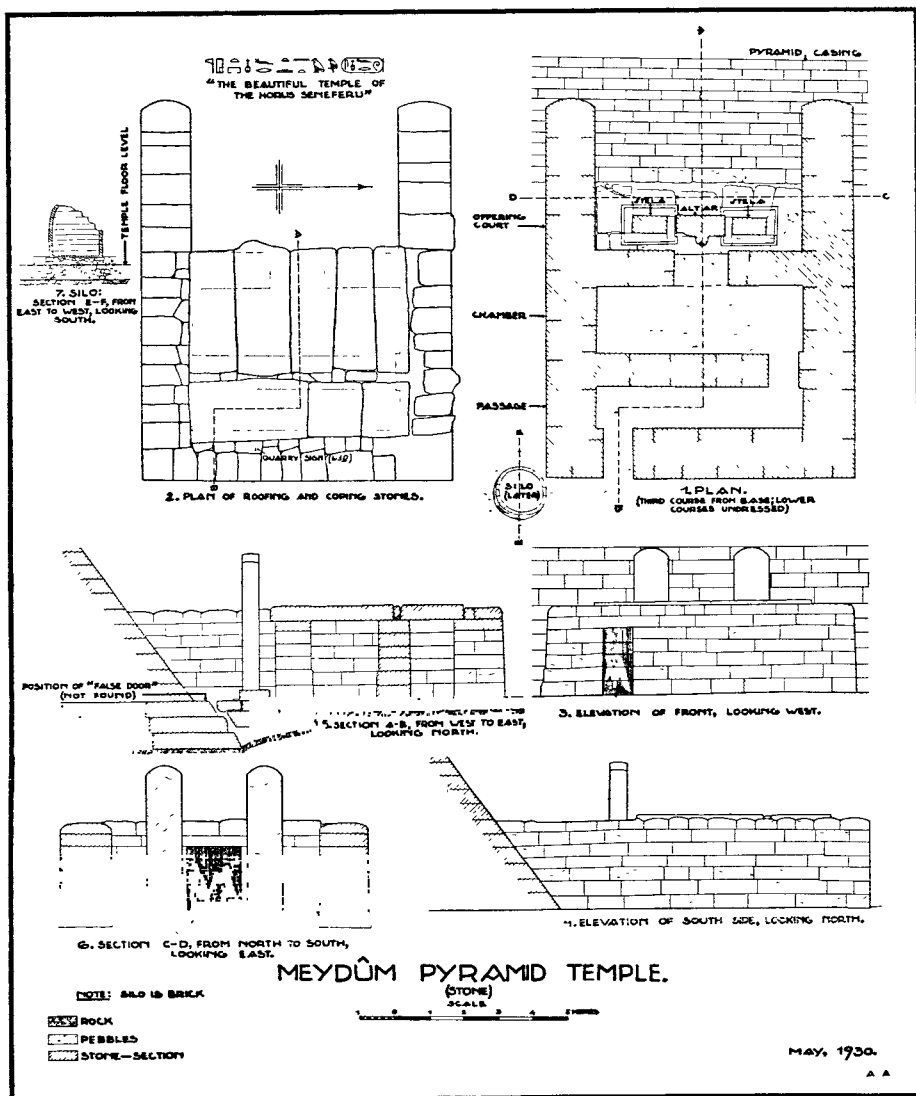


PLATE XI.—Plans, sections, and elevations of the Pyramid Temple.

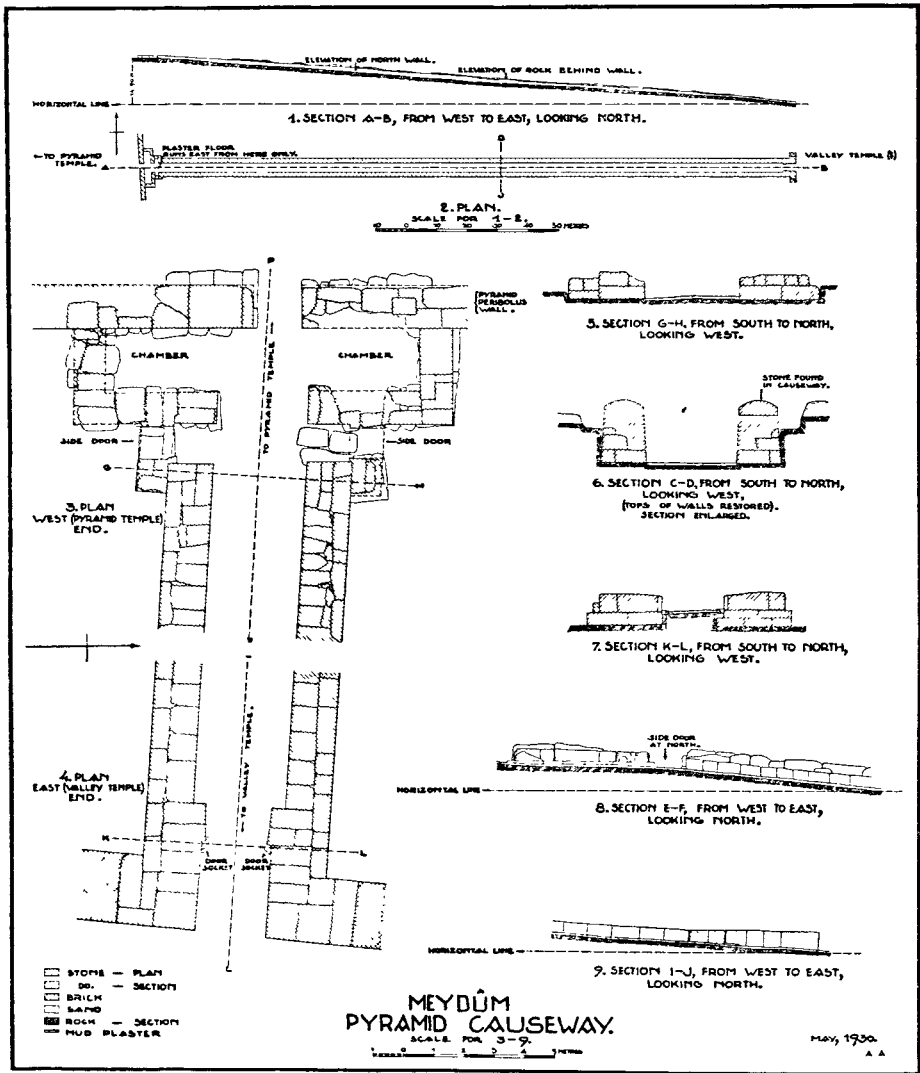


PLATE XII.—Plans and sections of the Pyramid Causeway.

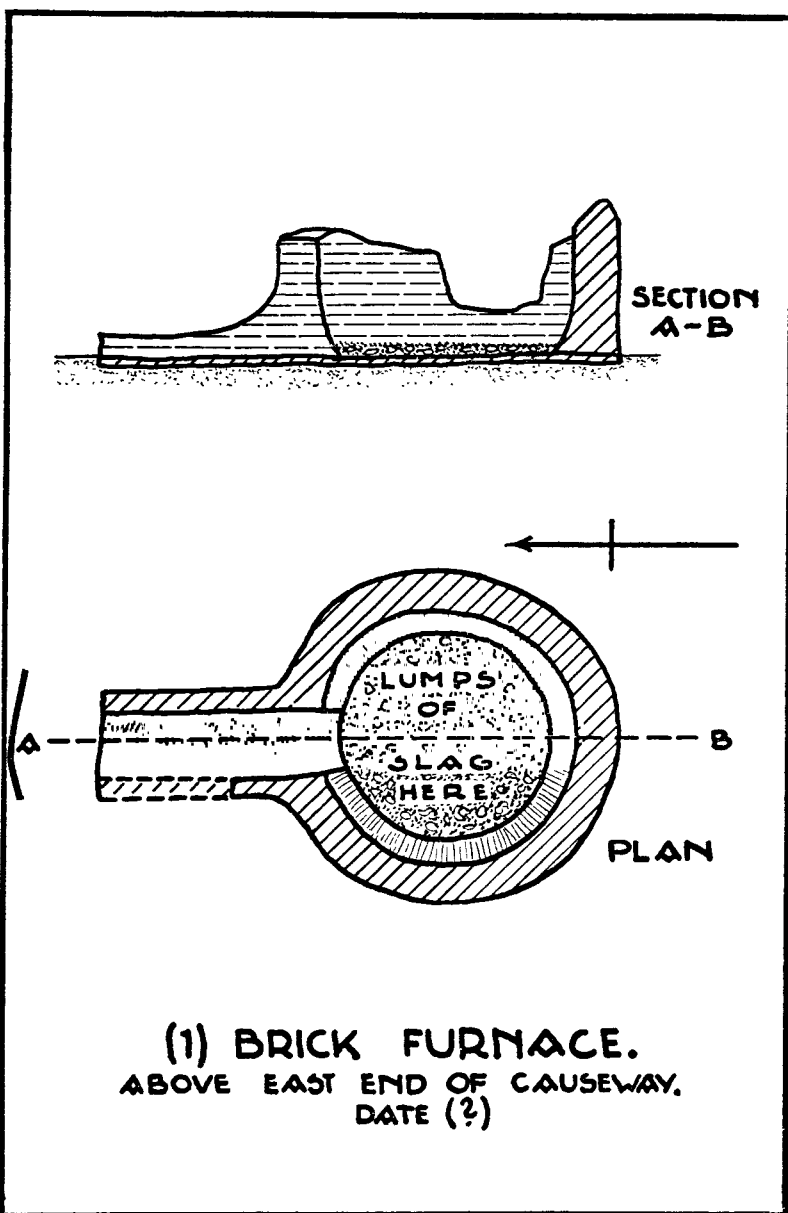


PLATE XIII.—Brick Furnace above the Causeway.

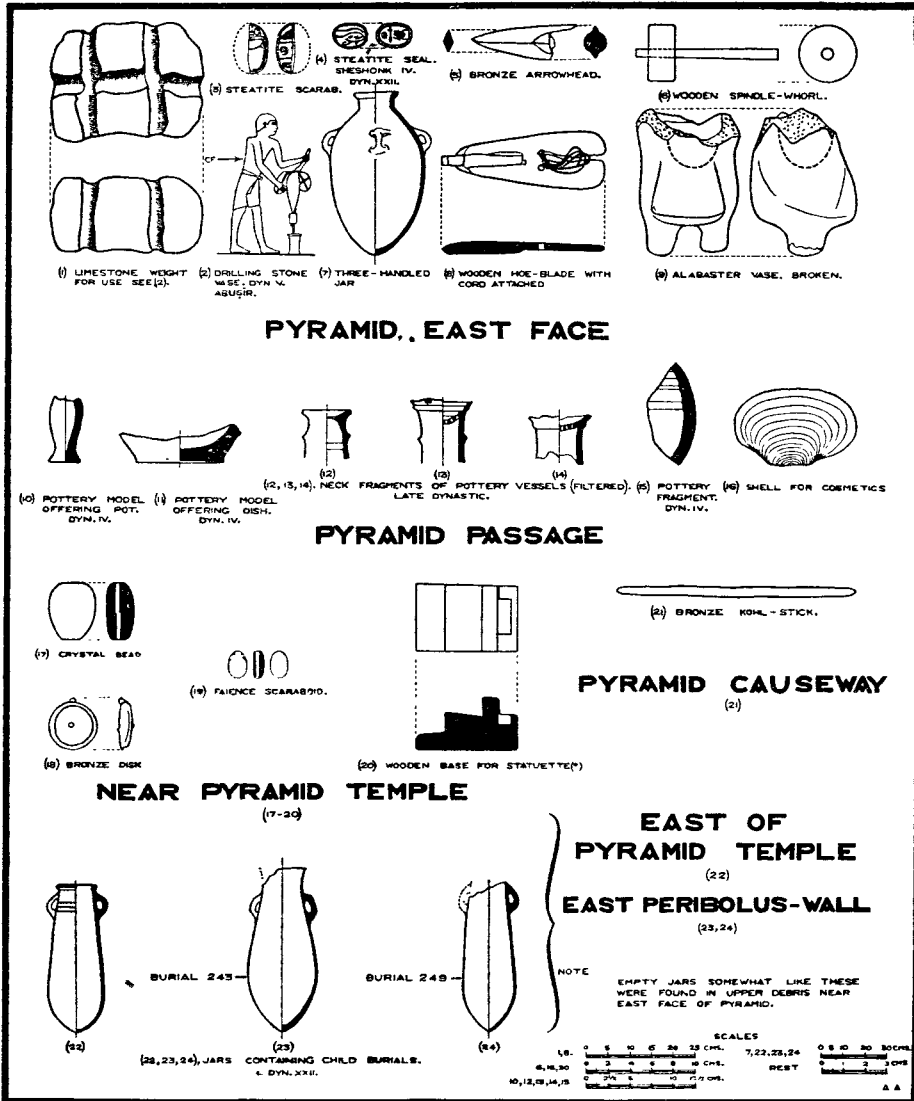


PLATE XV.—Objects from debris against the east face of the Pyramid, in Pyramid Passage, near Pyramid Temple, Causeway and East Peribolous Wall.

1



FIGURE 1.—Southwest angle.



FIGURE 2.—Southeast angle.

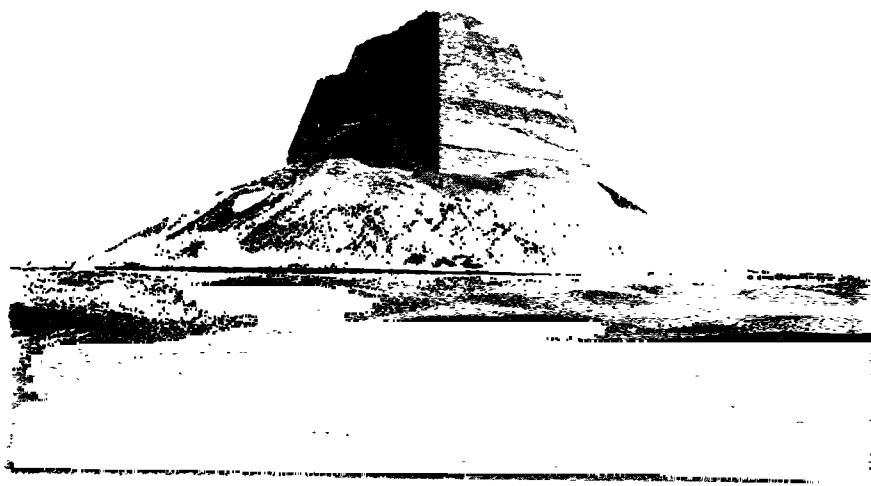


FIGURE 1.—Northwest angle.

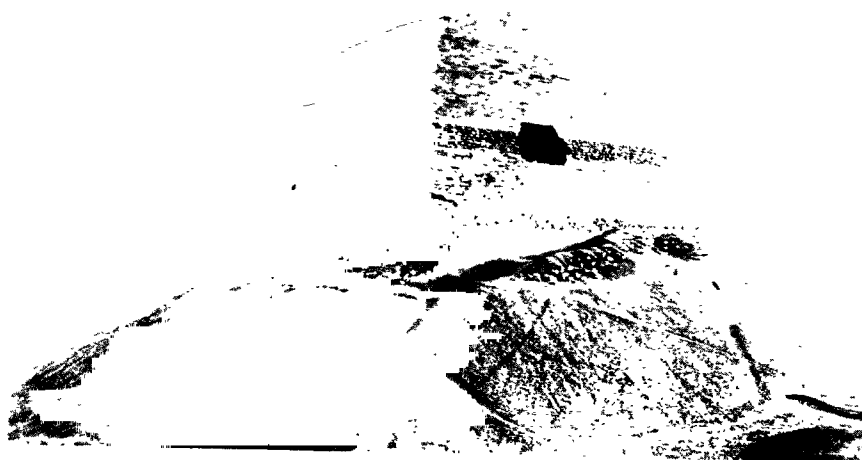


FIGURE 2.—Northeast angle.

PLATE XVII.—The Meydûm Pyramid.



FIGURE 1.—North side, looking southeast.



FIGURE 2.—West side, looking southwest.



FIGURE 1.—South side, looking southwest.

PLATE XIX.—The Meydûm Pyramid.



FIGURE 2.—East side, looking west.

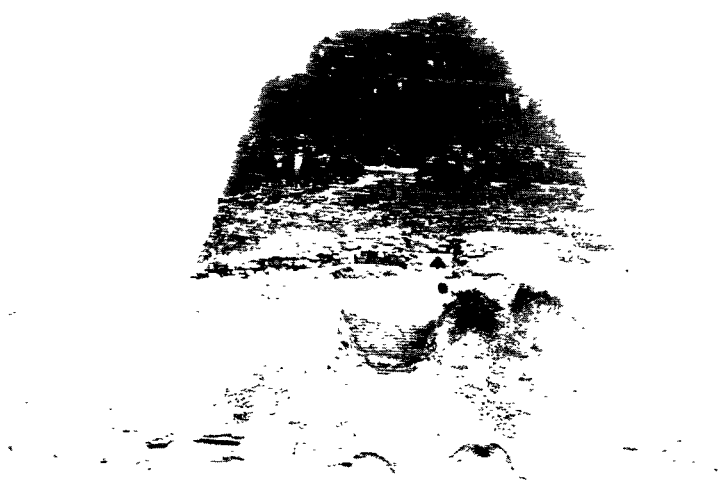


FIGURE 1.—North side, showing lower casing.

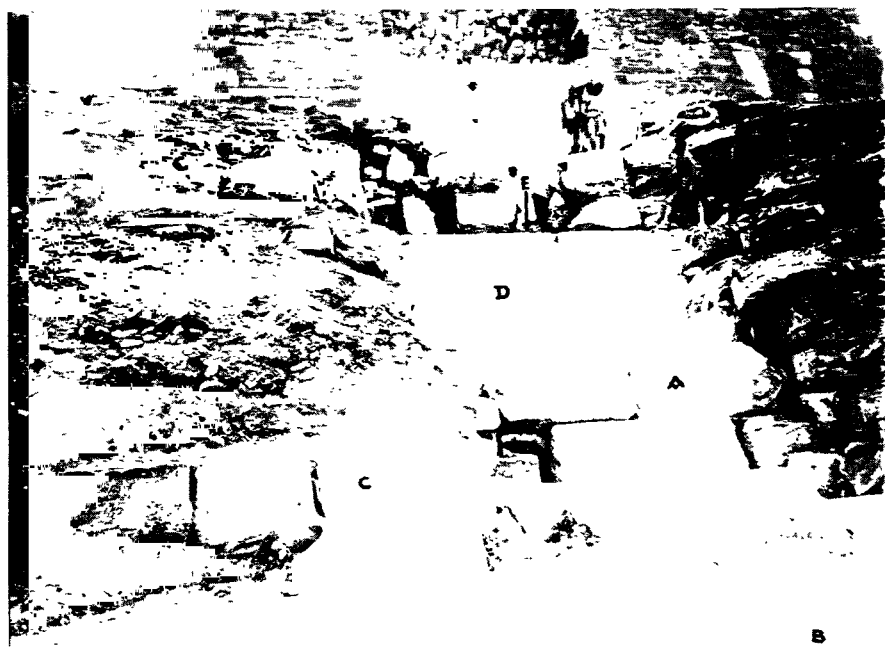


FIGURE 2.—North side, looking southwest.



FIGURE 1.--North side, looking southwest, showing lower part of casing.

PLATE XXI.--The Meydûm Pyramid.

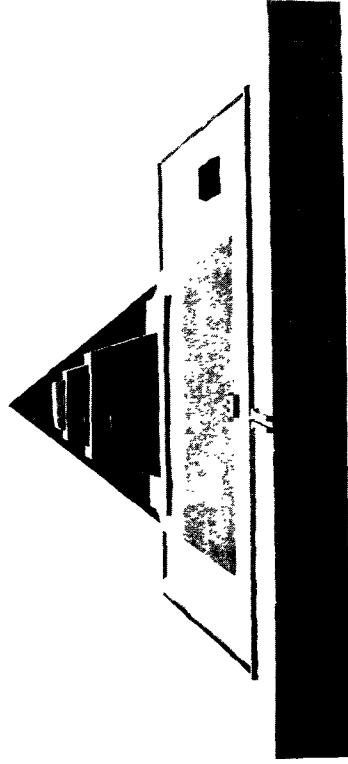


FIGURE 2.--Model of the pyramid.

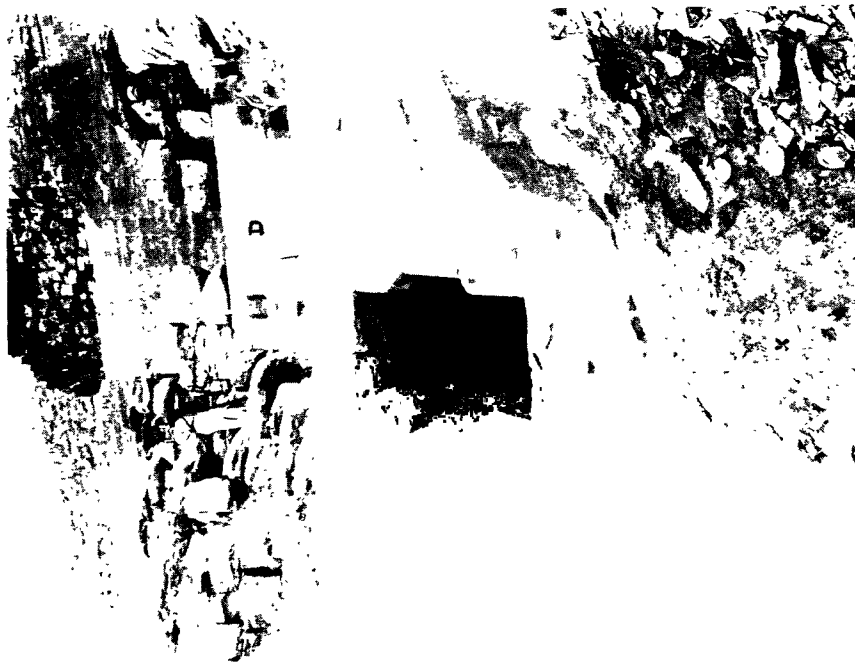


FIGURE 1.—Pyramid entrance.

PLATE XXII.—The Mejdûm Pyramid.

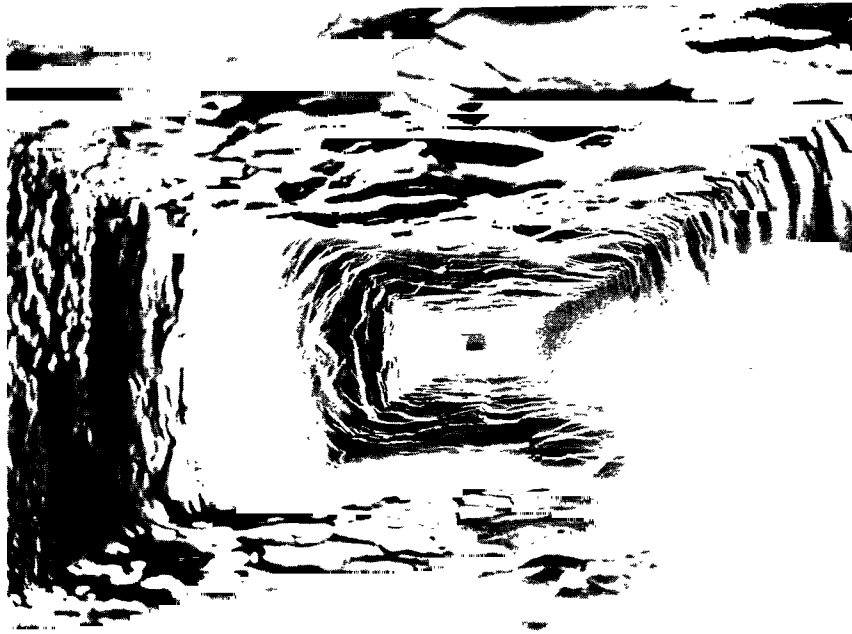


FIGURE 2.—Pyramid passage, looking down to the first ante-chamber.

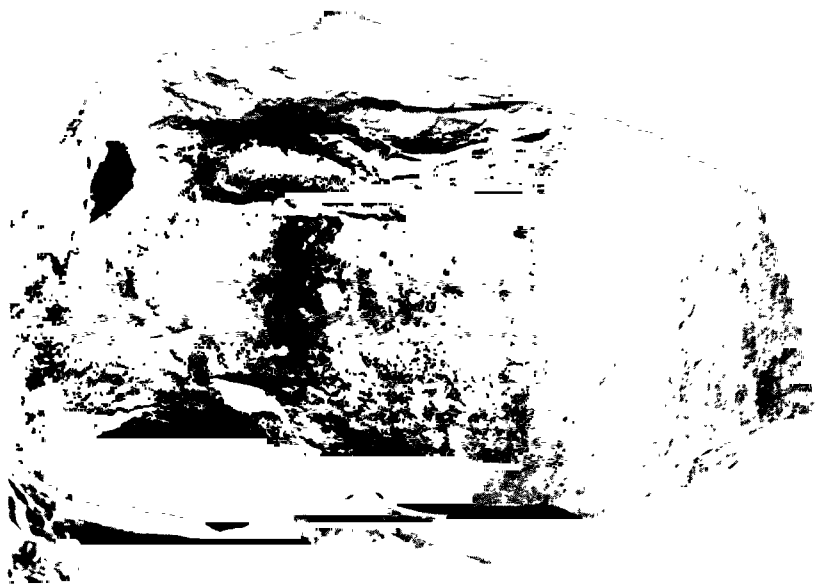


FIGURE 1.—First ante-chamber, looking from entrance to second ante-chamber.



FIGURE 2.—Second ante-chamber, looking from inner entrance of first ante-chamber.



FIGURE 1.—Passage from the second ante-chamber to bottom of the shaft.

PLATE XXIV.—The Meydium Pyramid.



FIGURE 2.—The Queen of the Belgians about to enter the pyramid on March 31, 1930.



FIGURE 1. Upper part of north end of sarcophagus chamber.



FIGURE 2. Lower part of north end of sarcophagus chamber.

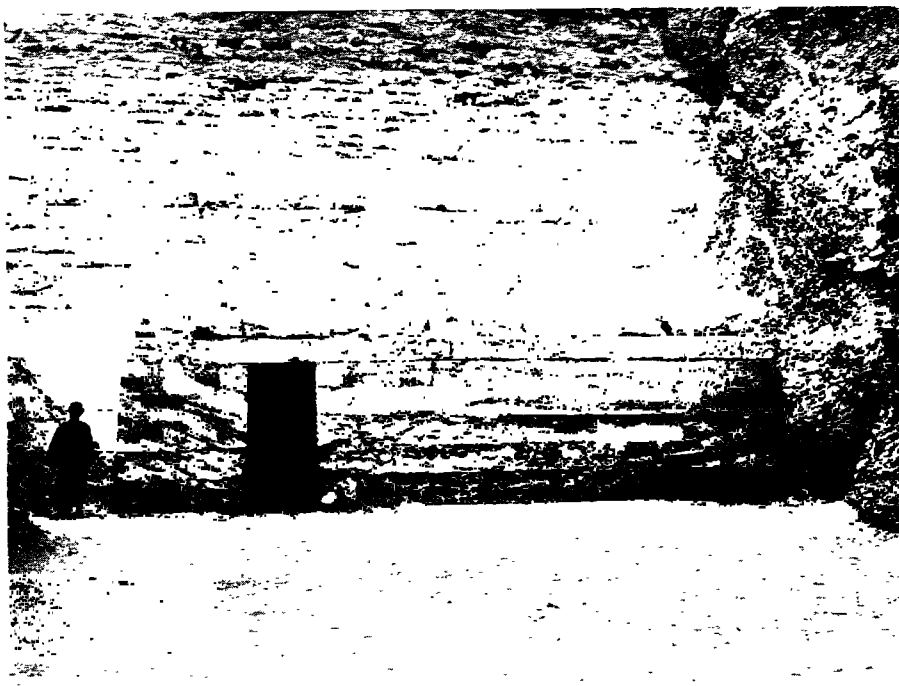


FIGURE 1.—Front view, showing entrance door.

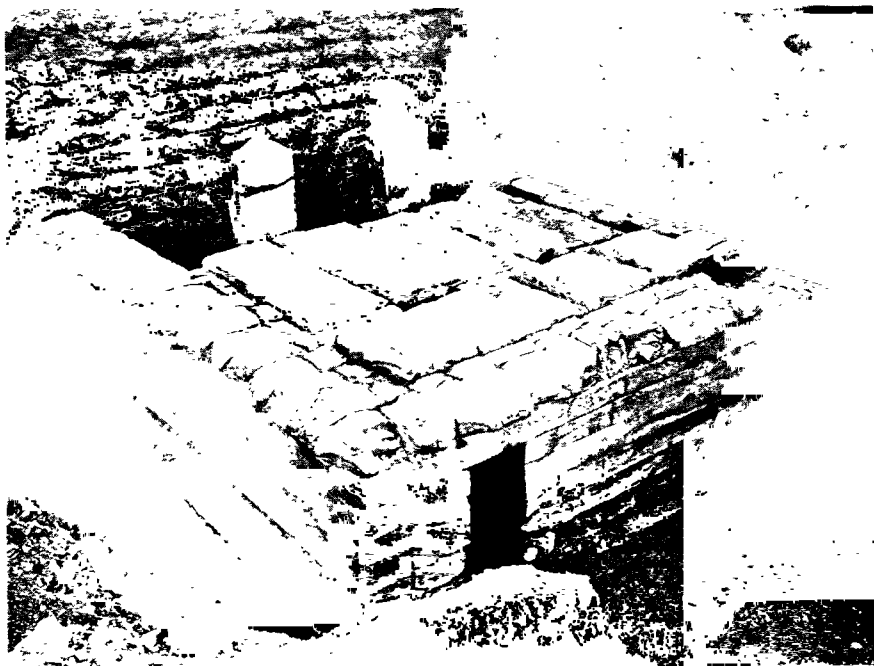


FIGURE 2.—Detail of the roof.



FIGURE 1.—The temple courtyard with stela and altar, looking northeast.
 PLATE XXVII.—The Pyramid Temple.



FIGURE 2.—The temple and the silo, looking northwest.



FIGURE 1.—South end of entrance passage, looking south.
 PLATE XXVIII.—The Pyramid Temple.

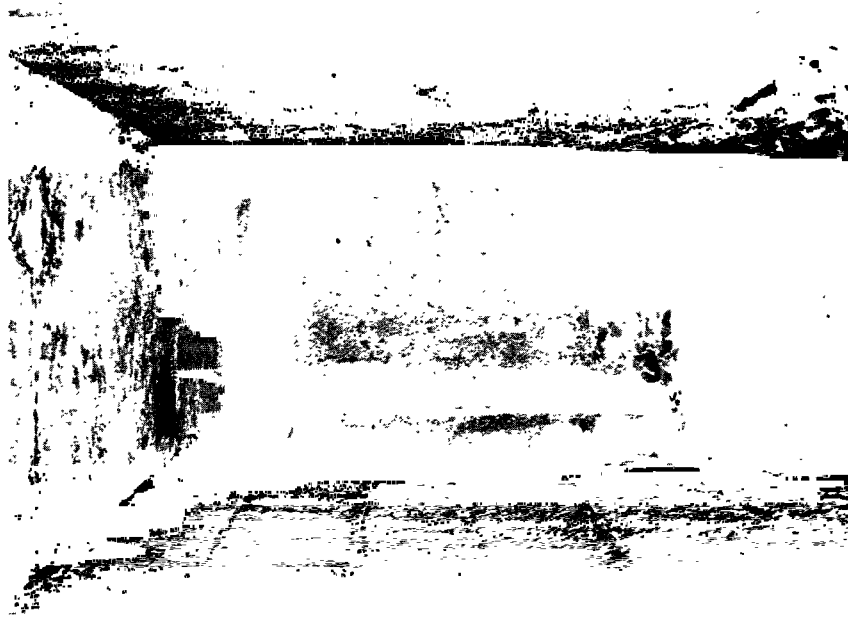


FIGURE 2.—North end of entrance passage, looking north, with
 door leading to inner chamber.



FIGURE 1.—Southern end of inner chamber, looking south.

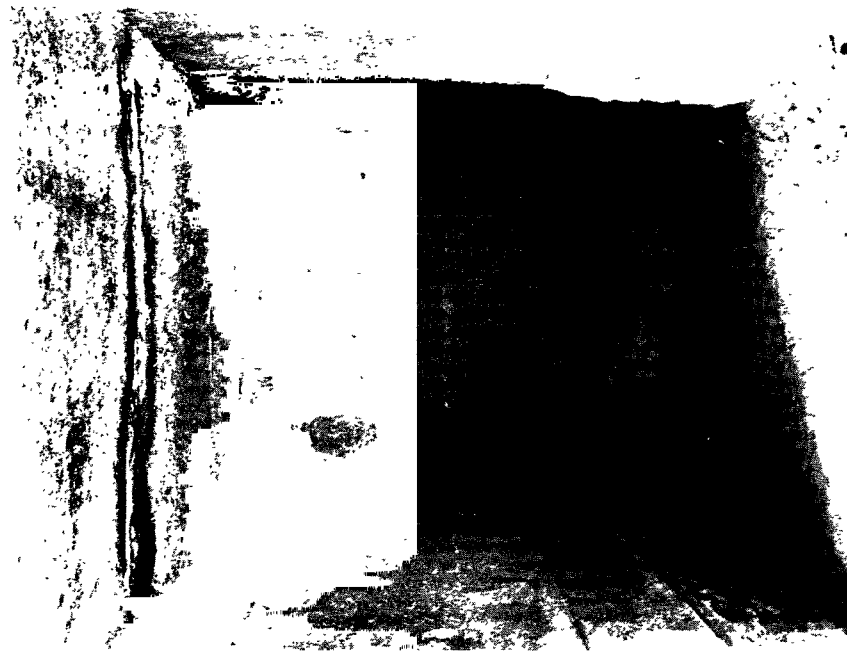


FIGURE 2.—Northern end of inner chamber, looking north.



FIGURE 1.—Foundations of the outer east wall with the entrance in the centre.



FIGURE 2.—Libation altar in the courtyard, with base of the pyramid in the background.



FIGURE 1.—Looking southeast and showing pyramid temple,
PLATE XXXI. The Causeway.

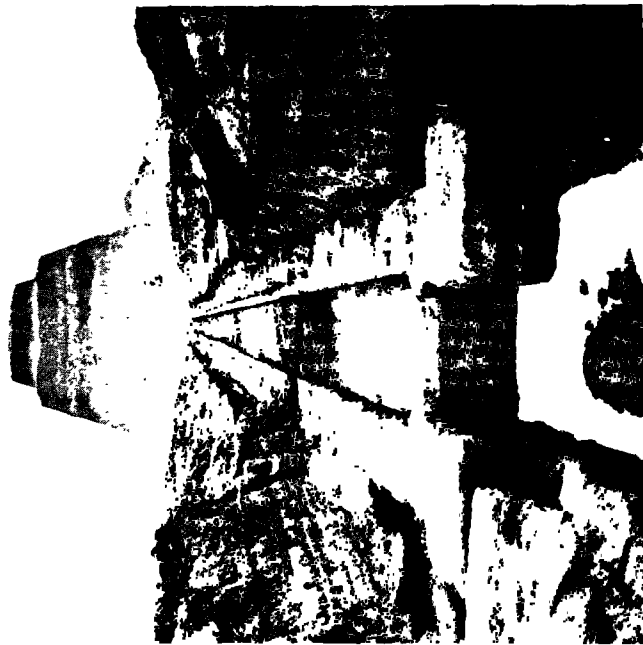


FIGURE 2. Looking west, with pyramid in background.

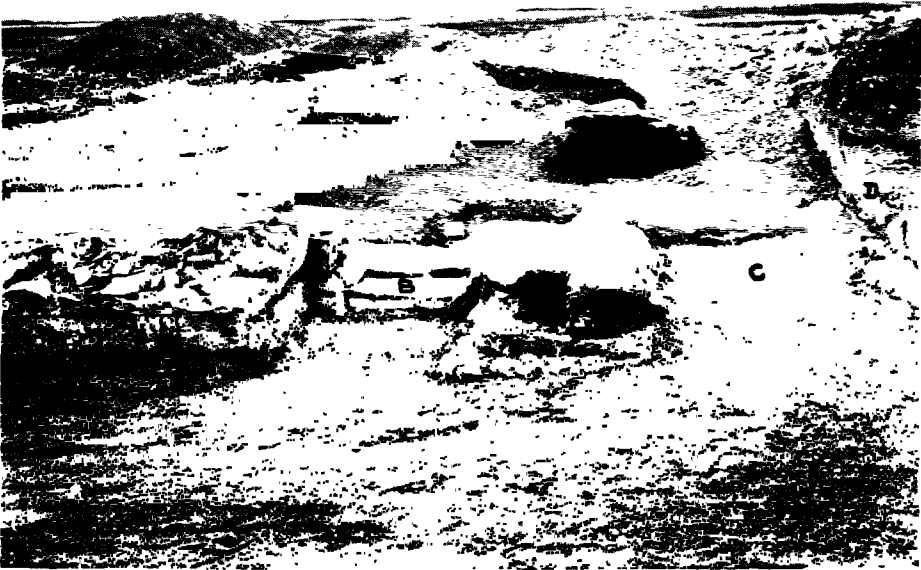


FIGURE 1.—South side of upper end, looking south.



FIGURE 2.—North side of upper end, looking north.



FIGURE 1.—Details of foundations of double door at valley temple end.



FIGURE 2.—Holes in the rock below the floor of the north statue-chamber.



FIGURE 1.—Coping stone of causeway wall.

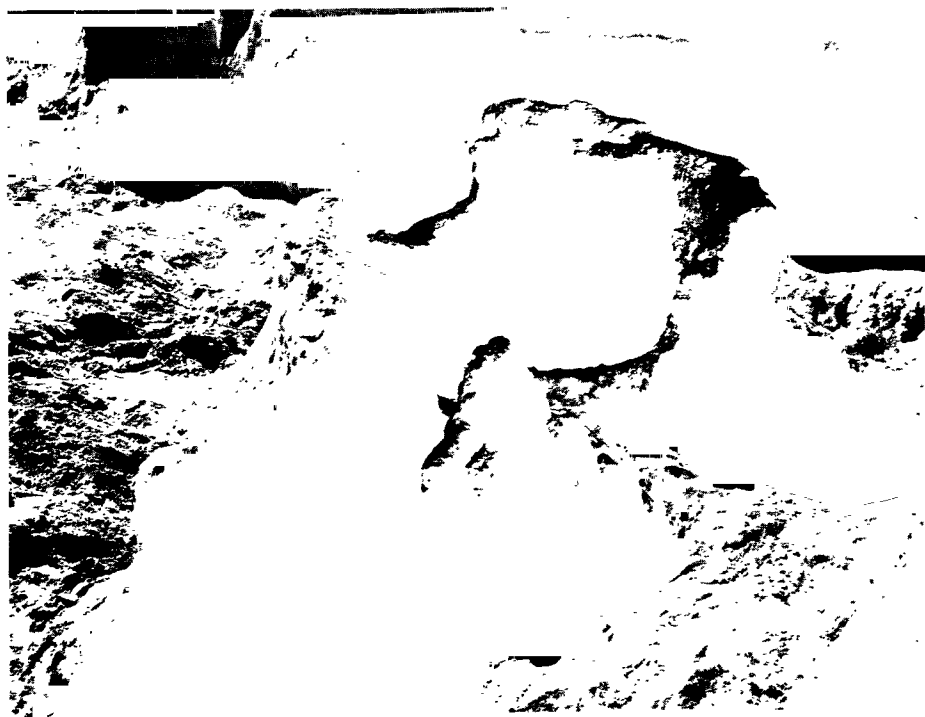


FIGURE 2.—Brick furnace containing slag, found above the south wall at the lower end of the causeway.

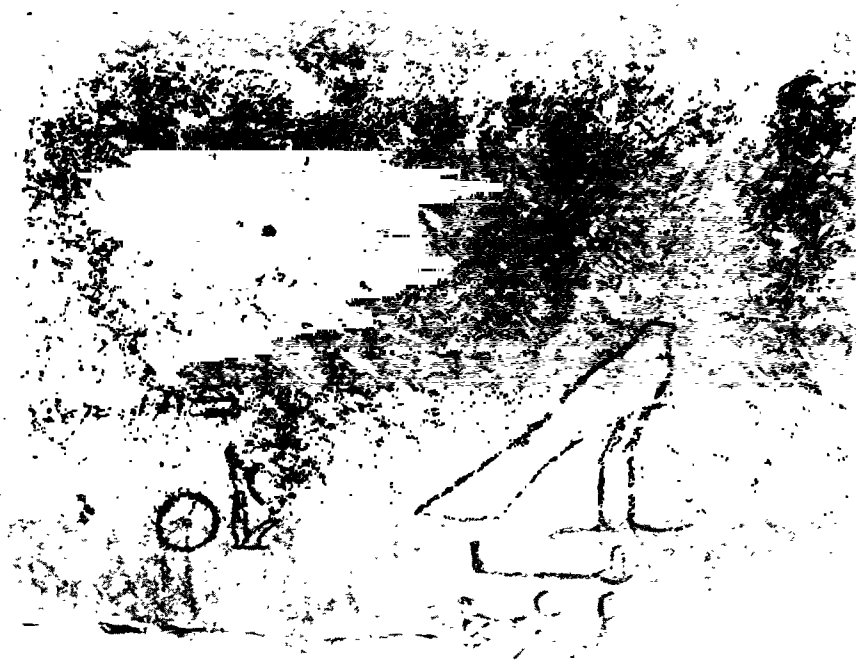


FIGURE 1.—Hieratic graffiti found in the pyramid temple.

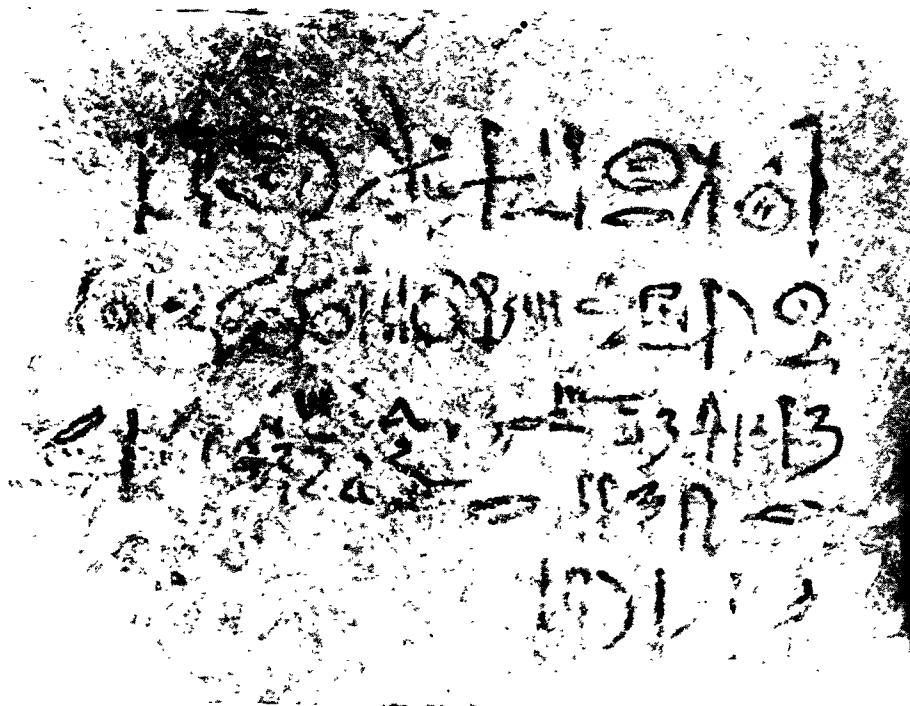


FIGURE 2.—Hieratic graffiti found in the pyramid temple.

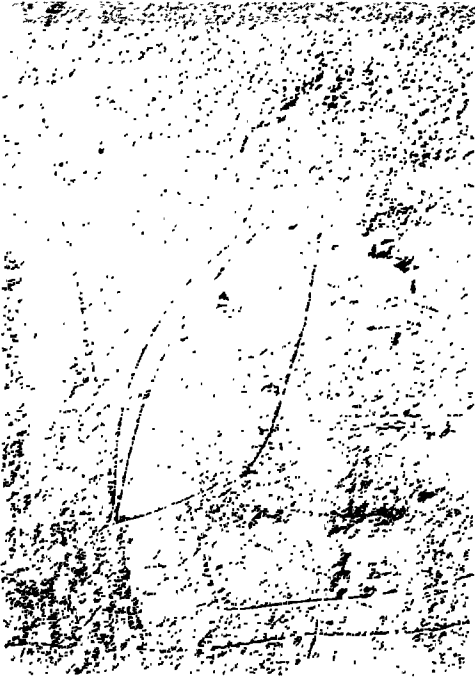


FIGURE 1.—The character *w* (quail chick) incised on stela in temple courtyard.



FIGURE 2.—The character *m* (owl) on the stela.



FIGURE 3.—Emblem of the "Sound" Quarry Gang, found in débris.

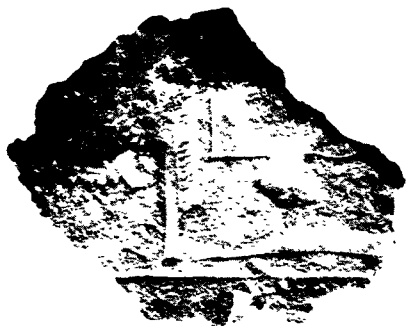


FIGURE 1. Fragment of private stela of an early dynasty, found near temple.



FIGURE 2.— Bread stamp (?) with corrupt Greek characters, found in debris.

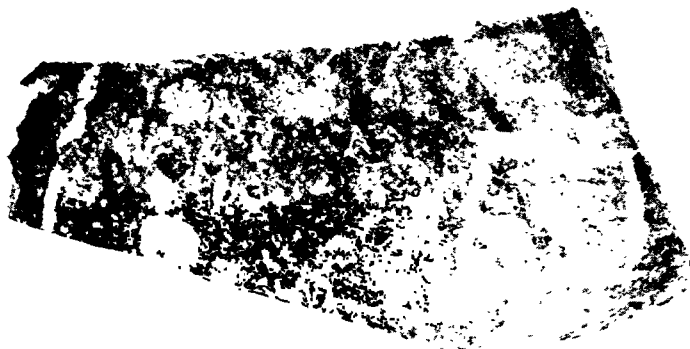


FIGURE 3.— Architect's sketch in black paint, found in debris.



FIGURE 2.— Quarrymen's inscription on stone from debris.



FIGURE 3.—Architect's sketch in black paint from area south-west of pyramid.



FIGURE 1.—Emblem of the "Vigorous" quarry gang on temple roof.



FIGURE 1.—Hieratic graffiti on ceiling of pyramid entrance passage.

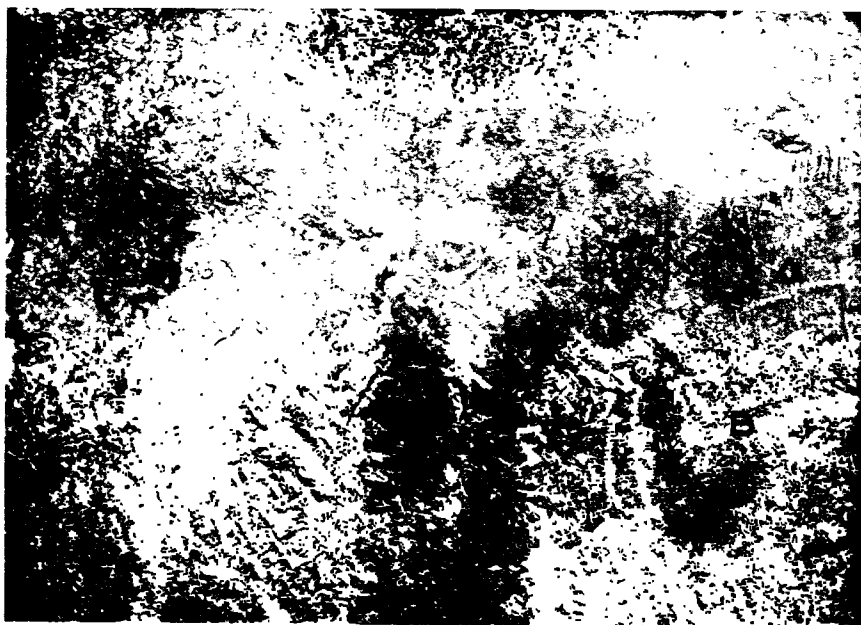


FIGURE 2.—Hieratic graffiti on ceiling of pyramid entrance passage.

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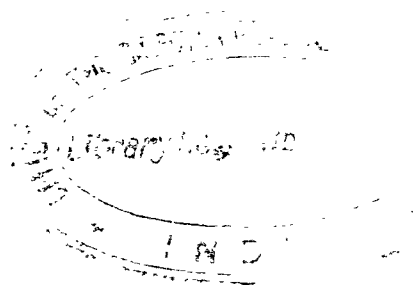
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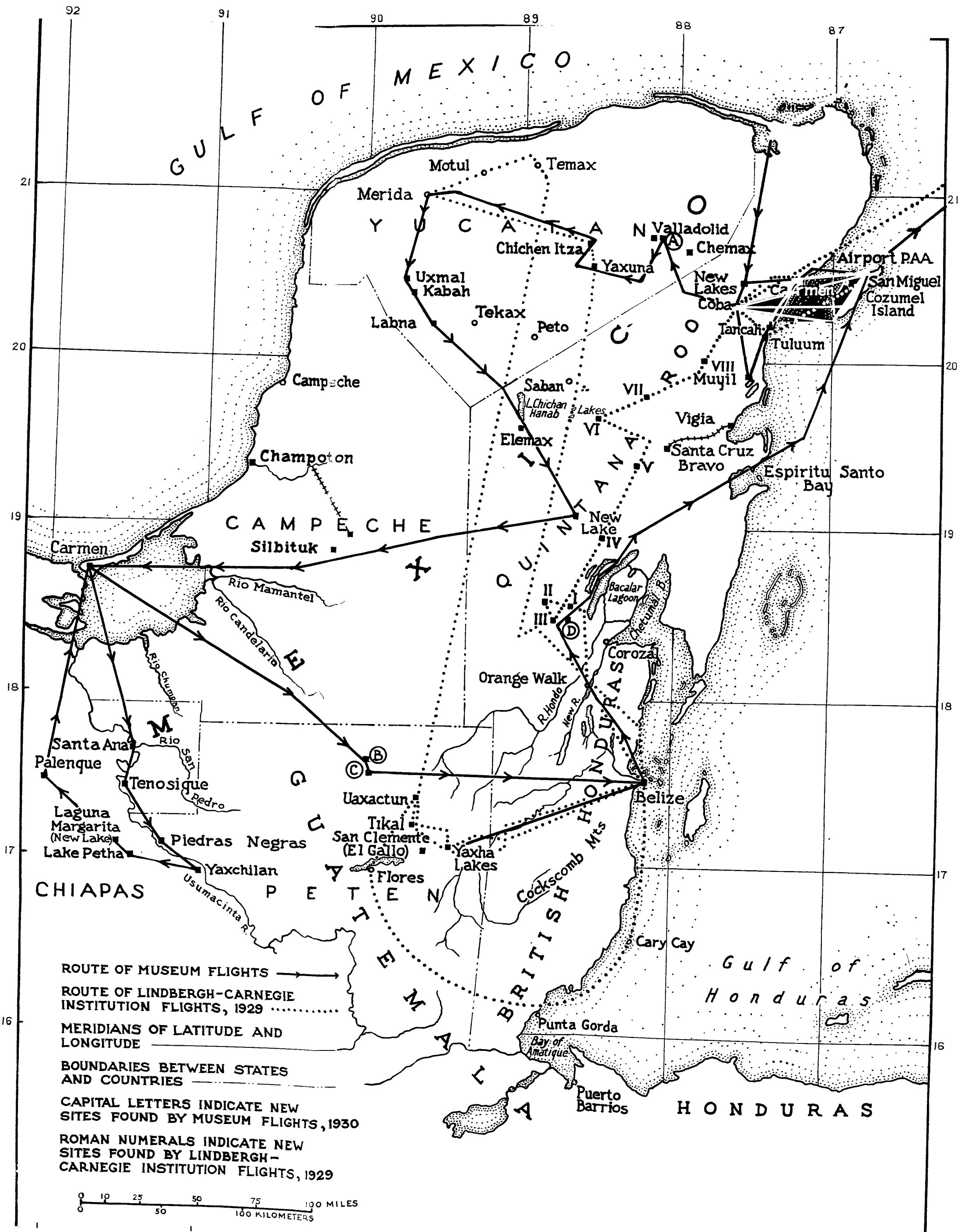


PLATE I.—MADEIRA: An Aerial Expedition to Central America.

The courses and distances of the above flights are only approximate and are necessarily subject to error in exactness.

Outlines of map and Lindbergh-Carnegie Institution flights, courtesy of GEOGRAPHICAL REVIEW

AN AERIAL EXPEDITION TO CENTRAL AMERICA

BY PERCY C. MADEIRA, JR.

THE indigo water of the Caribbean deep, bordered with azure and emerald on the edges of its white coral shores; limitless expanses of gray-green tree-tops stretching beyond far distant horizons, with lonely green mounds marking the ruins of palaces and temples built in Yucatan before the Normans ever came to England and in Guatemala when the Romans ruled the world. The great gorge of the Usumacinta River and the water-soaked wastes of Tabasco; the unknown lakes of Quintana Roo and Chiapas; the vast, flowering, tropical rain-forest of Guatemala; wide cloud shadows spotted over illimitable vistas; rain, wind, and heat; the sea and the sun and the sky. All these and many other beautiful settings formed the background of the Central American Expedition of the University Museum which set forth in December 1930 to explore the land of the Mayas from an airplane.

The expedition consisted of J. Alden Mason, Curator of the Museum's American Section, as archaeologist; Gregory Mason, a writer¹ and an archaeologist, of New York City, as field leader; Robert A. Smith,² of the Fairchild Aerial Survey Company of New York, as photographer, and Percy C. Madeira, Jr., of Philadelphia, as director. It was financed in part by the *Evening Bulletin* of Philadelphia and the *New York Times*, and the grateful appreciation of the University Museum is here extended to these newspapers for their interest in and assistance to this project. It is also most cordially extended to the responsible officials of the Mexican and Guatemalan Governments for their courtesy in granting the necessary permits; to Colonel Charles A. Lindbergh and Dr. A. V. Kidder, of Carnegie Institution, for their suggestions and advice on the work based on their previous experience in a somewhat similar project in 1929; to Mr. J. M. Eaton and Mr. R. I. Dunten of the Pan American Airways Company and their assistants for their extraordinary helpfulness throughout; and to the many individuals hereafter named whom we met in the course of the expedition for their hospitality and kindness.

The object of the expedition was to investigate the ancient Maya civilization of Central America from both air and land, particularly in those

¹ Mr. Mason has written a popular book on this expedition, which will shortly appear.

² Mr. Smith published a very good short account of the expedition in *The Sportsman Pilot*, in February, 1931.

areas not previously covered by either method. A brief summary of the achievements of this great early American people, a description of the territory within which they flourished, and an outline of the means of exploration employed, will be useful toward the proper understanding of the undertaking.

The Maya people of Central America had developed the foremost civilization in the Western Hemisphere long before the arrival of Europeans, and fifteen hundred years ago were in some respects the most advanced race in the world. Their civilization is generally believed to have been the rapid development in a moist tropical region of the archaic culture which began nearly five thousand years ago, with the domestication of wild corn and other indigenous plants in the semi-arid highlands of Mexico, and which thenceforth spread all over America.

Who the Mayas were, what name they called themselves, and whence they came are subjects of discussion outside the scope of this report, but it is now generally conceded that they were of purely American Indian stock. Shortly before the beginning of the Christian era, these peoples had settled in large numbers in Guatemala, in the adjoining states of Tabasco and Chiapas in southern Mexico, and in northern Honduras and the southern part of British Honduras. They then commenced the construction in numerous places throughout this area of the great complexes of stone buildings which formed the administrative and ceremonial centers of the population surrounding them. These usually consisted of long, low structures, commonly called palaces, which are believed to have been the homes of the rulers and priests, and of high artificial elevations supporting small buildings, generally called temples, which were almost certainly places of worship, and might be termed gigantic altars.

If a circle with a radius of one hundred miles be drawn, with Lake Flores in northern Guatemala as its center, it will include, with possibly one or two notable exceptions, every large site where Maya ruins of the earlier type have been found, and will embrace all of the great cities of what may be called the First Empire of the Mayas.

In view of the discoveries made in eastern Quintana Roo during the past few years, of monuments dated as early as many found in the Guatemalan cities, it seems desirable to abandon the former terminology of Old and New Empires, hitherto used by many archaeologists for the two phases of Maya culture, in favor of names such as First and Second Empires which do not so sharply separate in terms of time the principal areas of the two phases of this civilization.

The First Empire, with its center in Guatemala and a few outposts on and inland from the east coast of the peninsula of Yucatan, lasted for more than six hundred years after the beginning of the Christian era, during which centuries the Angles and Saxons were skin-clad barbarians in the North



PLATE 2. The Personnel and the Plane, at Miami, Florida. Left to right: Dr. J. A. Mason; William Carey, co-pilot; Frank E. Ormsbee, chief pilot; Robert A. Smith; Percy C. Madeira, Jr.; Gregory Mason.

Fairchild Aerial Surveys, Inc.



PLATE 3. Lakes discovered ten miles north of Cuba.

German forests. Different cities were built by the Mayas during this time in many different places in the area already described, and then this great civilization, due to a variety of causes not clearly understood, suddenly began to disappear. One by one, at widely different dates and in widely different places, the great stone palaces and temples in this southern region were abandoned to be swallowed up by the tropical jungle until about A. D. 629,¹ as far as is now known, the First Empire in the southern region was at an end.

During its great period in this southern area, the Maya people executed works in sculpture,² painting and pottery beyond the skill of the Egyptians or of any other early civilized people, their art showing a knowledge of the laws of foreshortening and perspective which the Egyptians or Assyrians never knew. Their architecture,³ especially at Palenque, compared very favorably with that of any peoples contemporaneous with them, with one or two notable exceptions. Their hieroglyphic writing, developed long before the Christian era, was very elaborate and is totally different from that of any other people.

It was, however, in mathematics and astronomy that the ancient Mayas reached their greatest heights. In these two fields of knowledge they far surpassed any people who had ever existed before them, not excepting the Hindus, Greeks, Romans or early Europeans. The Maya were the first of all peoples to invent the idea of zero and of place value in numbers (that is, the theory of a decimal system), thus permitting them to multiply and divide at least six hundred years before this same idea was again discovered independently by the Hindus and from them, through the Arabs, carried to Europe. This abstract mathematical conception consequently reached the white races from an alien source nearly one thousand years after the great astronomer-priests of the Mayas had used it on hundreds of occasions to record on their stone buildings and monuments dates in a calendar running back to 613 B. C. This calendar must have been based on centuries of stellar observations, and was far more accurate than that used by

¹ There are several different correlations of the Maya and Christian dates, varying by a total of nearly 520 years in the chronology of the First Empire. The correlation used in this article is the intermediate one proposed by H. J. Spinden and S. G. Morley. The subject is highly technical. The two theories of the leading American scholars are well set forth in Spinden's *The Reduction of Mayan Dates, Papers of Peabody Museum*, Vol. VI, No. 4, Morley's *Correlation of Mayan and Christian Chronology, Papers of the School of American Archaeology*, No. 11, and Spinden's *Maya Dates and What they Reveal, Brooklyn Institute Science Bulletin*, Vol. IV, No. 1, 1930. The leading authorities today favoring a correlation later by about 260 years, are J. Eric Thompson in *A Correlation of the Mayan and European Calendars, Field Museum Publication 241*, and John E. Teeple of Carnegie Institution in *Maya Astronomy, Contributions to American Archaeology No. 2*, published by the Carnegie Institution.

² *A Study of Maya Art*, by H. J. Spinden, *Peabody Museum Memoirs*, Vol. VI, illustrated.

³ *Maya Architecture*, by George O. Totten, The Maya Press, Washington, D. C., illustrated.

Europeans when Columbus first saw the green islands of the Caribbean Sea. The calendar of the Maya people is unlike any other ever devised, and its extraordinary accuracy entitles it to be classed as one of the greatest developments in abstract thought ever made by any people.

Centuries after the last known date so far found on the monuments in the southern area or in the eastern part of the peninsula of Yucatan, the same civilization of the same people, with a far finer architecture and wonderful woven fabrics and feather work, but inferior in sculpture and pottery, appeared once more in northern Yucatan and culminated in the great centers of Chichen Itza and Uxmal. This Second Empire, which was nearing its height at the time of the Norman Conquest of England, continued, with some modifications in its art and religion from Mexico about 1200, until its great city of Mayapan was destroyed in a civil war about 1451. After this, owing to further civil wars, and to hurricanes and disease, the Second Empire of the Maya rapidly declined and was far past its peak when the Spaniards first landed in force in Yucatan in 1519. The descendants of these people, speaking the same language and with many of the same customs, live in this country today.

In A. D. 500 and again in A. D. 1300, it is quite probable that the Maya civilization compared favorably both in art and in science with any then existing in the world. Certainly at both of these periods it was, with the exception of the general use of metals which do not exist in this area, and perhaps in its social and religious concepts, equal to any contemporaneous western European civilization. The centers of the First and Second Empires at their peaks were in all likelihood among the most densely populated regions of the world. It is interesting to note that all of the work of these people in building their great structures was done with stone tools and by human labor, as there were no horses or cattle in the Western Hemisphere before the coming of the white man.¹

A brief statement about the country itself will be helpful to show the size and characteristics of the region covered by the expedition. The word "Yucatan" as used in this article, unless otherwise specified, means the peninsula of Yucatan, and not the local province within it. This peninsula, which is nearly due west of Cuba, contains the Mexican states of Yucatan, Campeche and Quintana Roo, as well as the crown colony of British Honduras, and covers an area slightly larger than that of the state of Pennsylvania. It is about two hundred and fifty miles long north and south and two hundred miles wide east and west, and thus includes fifty thousand square miles. Yucatan is cut off from Mexico by hundreds of miles of jungle and

¹ For a general outline of prehistoric Central American civilization see *Ancient Civilizations of Mexico and Central America*, H. J. Spinden, *American Museum of Natural History Handbook No. 3*, Third Edition, 1928. For a more detailed account of the Maya, see Gann and Thompson's *History of the Maya*, Scribners, 1931.



PLATE 4. Coba Lakes, looking slightly north of east; the largest ruin is between the two lakes in the foreground.



PLATE 5. Coba Ruins.

swamp through which no rail, nor road, nor wire runs, the only communication being by sea or air. The state of Yucatan is fairly well settled, but most of Campeche and nearly all of Quintana Roo is still covered with the growth of centuries and inhabited by small groups of natives in villages far apart and linked together only by mule trails. South of Yucatan the Mexican states of Chiapas and Tabasco, and the republics of Guatemala and Honduras comprise the balance of the country of the Mayas.

Geologically, much of Yucatan is of quaternary limestone formation, so recent in origin that it is still mostly porous. Consequently, the rains seep rapidly through the surface and thus leave the area without a single important river except in the extreme southwestern part of the state of Campeche. The peninsula is nearly flat except for a band of rolling, broken country, running nearly north and south in the western portion of the peninsula throughout its entire length, with two ranges of higher hills which are off-shoots from this region. These start near Uxmal and extend at angles toward the southeast and southwest, the latter range dwindling out into the great central plain after a comparatively few miles. A chain of hills runs north-northeast and south-southwest along the east coast near the sea, commencing in western British Honduras. This formation becomes a low flat plateau west of Lake Bacalar studded with hills and broken by patches of lower soggy country, and gradually dies out around Tulum. In the extreme southern parts of Quintana Roo and Campeche the country becomes more rugged. Low hills are found in northern and central Guatemala, and higher hills or low mountains along the upper reaches of the Usumacinta River and in southwestern British Honduras, where several of the most celebrated First Empire cities have been discovered.

The climate of this region is dry from December to May, with a heavy rainy season in mid-summer and again in October and November. In the winter the temperature near the sea is about the same as that of Miami, Florida; that is, between 70° and 80° at all times in the shade, but much hotter in the sun. Inland and in the rainy area to the south it is on an average perhaps 10° warmer and much more disagreeable because of the high humidity.

The airplane used by the expedition was a Sikorsky amphibian biplane, model S 38, No. NC 8044, having space for four passengers. It was equipped with two 425-horse-power Pratt and Whitney Wasp engines, and flew at a normal cruising speed of eighty-five nautical miles, or about one hundred land miles an hour. This great machine was chartered by special arrangement with the Pan-American Airways Company, starting from Miami, Florida. Owing to the amount of weight carried, and the wild nature of the country to be covered, as a measure of safety the surplus gasoline tank was removed before leaving so as to permit the plane to remain in the air

at a low altitude with only one motor working. This reduced the gasoline capacity to two hundred and twenty gallons. In operation the Sikorsky consumed on an average about fifty gallons an hour so that the distance it was possible to fly without refueling was limited to a little over four hours, or about four hundred land miles. The plane was equipped with a radio, with which it both sent and received messages. Under the company's regulations, the position of the plane was reported by radio at regular intervals, and from time to time it received reports from its next destination about the local weather conditions. In actual flying the four members of the party sat in two rows of two seats one behind the other. The roar of the engines was so great that our ears were filled with cotton and all communication was by writing only. This was a serious defect in work of the kind undertaken by the expedition, as at times rapid changes of direction were desired which were difficult to communicate quickly to the pilot. Future expeditions of this general character should carry head phones with which the responsible leader can readily discuss with the pilot any desired deviation from the course.

The Pan-American Airways Company, who put all of their unusual facilities at our service and to whose help throughout much of the success of the expedition is due, have their principal base at Miami, but maintain landing places with fueling stations at Havana, and at San Julien near the western end of Cuba; at Cozumel Island, off the northeast coast of Yucatan; and at Belize, in British Honduras. Through a subsidiary Mexican company, they also have airports at Merida, the capital of the state of Yucatan, and at Carmen, a small island seaport off the southwest coast of the state of Campeche. None of these airports are more than three hours flying or three hundred miles apart; all are equipped with powerful radio apparatus, and all employ excellent mechanics, who kept the plane in perfect condition.

The expedition used the Blom-Ricketson-Spinden maps of the Maya area, 1929 edition, as their principal guide. In addition, the U. S. Navy charts of the coastal area, and the 1930 official Mexican government maps of the region involved were carried and frequently consulted. The excellent and interesting report¹ of the Lindbergh-Carnegie Institute flight of 1929 over other parts of the same area was also of the greatest value throughout. The routes covered by the two flights are shown in the map found at the beginning of this article, Plate 1.

The expedition carried with them almost all the equipment needed for work on land, as it was impossible to determine in advance what would be required. It was hoped that new sites near some lake or other landing place would be discovered where the plane could put us down to do field work. Part of the standard equipment of the plane consisted of a rubber boat and oars; and a shot gun and ammunition, blankets, ponchos, ham-

¹ *Geographical Review*, April, 1930, pages 177-206, illustrated.



PLATE 6. Coba Ruins.



Fairchild Aerial Surveys, Inc.

PLATE 7. Water-Front, Town of San Miguel Cozumel.

mocks, machetes, canteens, a water bag and five days emergency rations were always in the plane as insurance against the outcome of a forced landing. As a matter of interest a full list of equipment carried is set forth in Appendix A hereto.

The party left the North on the Havana Special on the night of Sunday, November 30th, and arrived at its real starting point at Miami, on the morning of December 2d. After a certain amount of difficulty about the weight of our baggage, which compelled us to leave behind all but the most absolutely essential articles, the plane finally took off from the Miami airport at about 2 P. M. in charge of Captain Frank Ormsbee, who handled the ship superbly throughout, with William Carey, who splendidly supported him, as co-pilot and radio operator, as well as recorder of the compass bearings, courses, times, and other data on the flights. [Plate 2.] Favored with a strong following wind, the Sikorsky landed at Havana at a few minutes before four o'clock, covering the two hundred and sixty-one land miles of distance between the two cities in one hour and fifty-three minutes, or at the rate of about one hundred and thirty-five miles an hour. Leaving Havana the next morning, December 3d, at 7.42 A. M., we refueled at San Julien, Cuba, crossed the western end of the island at ten o'clock and reached the northeast coast of Yucatan at Cape Catoche at 11.08 A. M.

All maps and charts of this region showed a very large lagoon or indentation in the land a short distance west of Cape Catoche. This no longer exists. A flight over this area to examine it for possible ruins revealed that the lagoon was filled up except for a few shallow water courses. The plane then flew almost straight south about thirty miles inland from the sea over country which had not before been examined from the air. The extreme northeast portion of the peninsula is flat and overgrown with jungle, with a few scattered clearings here and there. For the most part, at least at the end of the rainy season, this area is so swampy that it is doubtful if it could have been inhabited in the past by large enough masses of people to have constructed any important sites.

At 11.57 the expedition arrived at the point where the lakes of Coba were shown on existing maps and found several bodies of water, but, as seen from the air, they did not fit the description of the site of that important city. There were no signs of any ruins. These lakes, which are located at approximately 87 degrees 42 minutes west longitude and 20 degrees 38 minutes north latitude, consist of one large body of water, more than a mile long and in places one half mile wide, with a pronounced shallow place in the middle, and four other lakes around it, three of them in a chain running due east and west. [Plate 3.] They are approximately 28 miles inland almost due west of the northern end of Cozumel Island. It was decided to name these lakes for the director of the expedition, and after they were photographed

the Sikorsky headed for Cozumel Island. Three or more other lakes were in sight well to the south. The plane finally crossed over an Indian village on the edge of the sea, probably Playa Carmen, at 12.21 and landed on the beautiful blue lagoon of the Pan-American Airways Company's Cozumel Island base at about 12.30. The morning trip covered one hour and twenty-five minutes flying time in Yucatan.

Cozumel Island, "The House of the Swallows" in the Maya language, was once a sacred spot to which the Mayas of old made pilgrimages from the mainland. It contains traces of several ancient stone roads and many small ruins and shrines lost and forgotten in the forest. The earliest historical mention of this little island is in the Chronicle of Chicxulub written in modern characters by the Maya, Nokuh Pech about 1562. This Chronicle includes the somewhat startling recital: "Thus the land was discovered by Aguilar who was eaten by Ah Naum Ah Pat at Cuzamil in the year 1517."¹

The party was met by the local manager of the Airways Company and about eight Mexican officials from the town of San Miguel Cozumel some ten miles away, headed by General Trevino, Governor of the island, and by the Chief of Customs, both friends of Mr. Gregory Mason as the result of his previous visits to the island. All immigration, customs and quarantine regulations were waived in our favor and these officials explained that they had come over early in the government launch in order to take the expedition to the town, where there was to be a fiesta, or party, which would start upon our arrival. We regretted that unfortunately there was so much to do and so little time in which to do it that it was not possible to accept their kind invitation just then, but said that we would be honored to be their guests in the evening. Four of the officials accepted at once an invitation to go up in the plane and took a short ride of some eight or ten minutes. They then left after promising to send the customs boat back about five o'clock the same afternoon.

At 2.05 P. M. the plane again left the airport and flew straight south along the long axis of Cozumel Island, which was absolutely flat and covered with thick jungle except for a few scattered clearings close to the sea. Photographs of the island were taken from the air, and at 2.25 the plane headed due west for the mainland to return to the lakes first seen in the morning. From an altitude of about 6700 feet, three large lakes, and one small one, were plainly visible, well to the south. Ten minutes later the shore line was crossed and at 2.50 the plane was over what were at first thought to be the lakes examined in the morning, but which on closer inspection were found to be a different group. The flight was continued northward and in a few minutes the lakes previously visited were reached and again examined care-

¹ *The Maya Chronicles*, pp. 226-227, by Dr. D. G. Brinton, privately published in Philadelphia in 1882.



PLATE 3. Indian Village of Puulmul, East Coast of Yucatan.



Furchild Aerial Surveys, Inc.

PLATE 9. - East Coast of Yucatan, looking north.

fully for ruins, the plane flying almost over the treetops, but as no evidence of buildings were seen, we returned to the other group of four lakes, still flying low. This second group proved to be the lakes of Coba, and were found to run roughly in a line west-northwest and east-southeast, the two larger ones being toward the northwest. [Plate 4.] Near the north bank of the second large lake a pyramid and large mound showed plainly through the trees with evidences of masonry visible in several places. These ruins were seen several miles away and thus taught us the technique of ruin hunting. Mounds marking the site of ruins are nearly invisible from an altitude of more than 1000 feet but show up on the skyline when the plane is low down over the flat country characteristic of this region. The vegetation on them also seems different in some indescribable way from that of the surrounding country.

The principal structures seen at Coba were a very large mound and a pyramid at the edge of the largest lake to the west, the two ruins just north of the second lake, and an enormous mound, which probably contains more than one building, rising on the neck of land between the two bodies of water. The site is one of the oldest in Yucatan, and was settled long before Chichen Itza. During the period of the First Empire fifteen centuries ago it was probably the largest and most important city in the Yucatan peninsula. These ruins of Coba were photographed from the air at a low altitude; Mr. Smith, then as always, working from what seemed to the rest of the party an appallingly dangerous position. [Plates 5 and 6.] The plane then rose to a considerable height and thus revealed a causeway starting between the two large lakes and running south, another running south from the second large lake and intersecting with the first causeway, and a third causeway running due north. These ancient stone roads, built more than a thousand years ago, now show up from the air as straight lines of vegetation, which like that on the ruins differs in some indefinable way from the surrounding forest. Photographs of these causeways were taken in which they appear very plainly, more so, in fact, than they did to the eye at the time. No causeway was visible running west to the site of Yaxuna, south of Chichen Itza some seventy miles away, although it had been reported by several previous visitors to Coba, and partly cleared by R. R. Bennett,¹ whose accounts of his work there are most interesting.

At a few minutes after four, the plane left the site of Coba and reached the coast at 4.18. From the bearings taken on these two flights to Coba and the time from the site to the coast, as well as the plotting of the next morning's trip, the position of the Coba Lakes and ruins appears to be at approximately 87 degrees 42 minutes west longitude and 20 degrees 30 minutes north

¹ *The Ancient Maya Causeway in Yucatan*, by R. R. Bennett, Museum of the American Indian, Heye Foundation, 1930, illustrated.

Coba by Land and Air, by R. R. Bennett, *Art and Archaeology*, Vol. XXXI, No. 4, April, 1931, with illustrations.

latitude. This location is about ten miles south of the position shown on the large maps of the expedition and, allowing for wind drift, about twenty-five miles inland from the sea in a line running due west from a point about nine miles north of the southern end of Cozumel Island. This finding checks very closely with the position of Coba as determined by the Lindbergh-Carnegie Institution flight of 1929,¹ except that, according to the Museum Expedition's calculations, it is about four miles farther inland and perhaps five miles more to the north.

Once more the plane flew lengthwise over Cozumel Island, passing above an artificial mound near its north end which was examined carefully from a low altitude but showed no signs of masonry. It is probable that this is a ruin of some kind which has apparently not been reported. This northern part of the island is very low and swampy and seems to be almost uninhabitable in the rainy season. The expedition landed at the Cozumel Island Lagoon at ten minutes of five, after two hours and forty-five minutes flying time for the afternoon, or four hours and ten minutes for the day over Yucatan.

In talking over the work, the pilot advised that a plane as large as the Sikorsky could easily land on and take off from the largest lake of the first group seen north of the Coba Lakes, except for the shallow place in the middle about whose depth he was uncertain. On the other hand, such a large plane should not land on the water at Coba unless forced to do so. According to Captain Ormsbee the chances of a successful take-off would be greatly in favor of the plane, but the high trees on the neck of land between the two larger Coba lakes rendered it a little uncertain, and the risk would not ordinarily be justified. In the Carnegie Institution flight over these lakes with the same type of plane, Colonel Lindbergh reached the same conclusion. The larger lakes at Coba could, however, be easily used today as a landing place for an autogiro or a light 300-horse-power plane equipped with pontoons; or even for a plane the size of a Sikorsky amphibian, if the trees on the neck of land between the two large lakes were cut down. This would not be a very difficult or lengthy undertaking for a ground party.

After changing clothes, we took the government launch on a rough and wet ride to the little town of San Miguel Cozumel, some ten miles away. The island of Cozumel is now inhabited by about 1500 people, nearly all of whom are pure Maya Indians. They are short in stature, averaging perhaps 5 feet 4 inches in height, but very strong. Their skin is not red, but a light bronze, and they are exceedingly clean. The port of San Miguel Cozumel [Plate 7] owes its existence to the chicle industry of Yucatan. This product, which is the hardened juice of the sapote tree and forms the base of all chewing gum, is exported from eastern Yucatan entirely through this one little place.

¹ *Geographical Review*, April, 1930, page 203.



PLATE 10. Tulum.

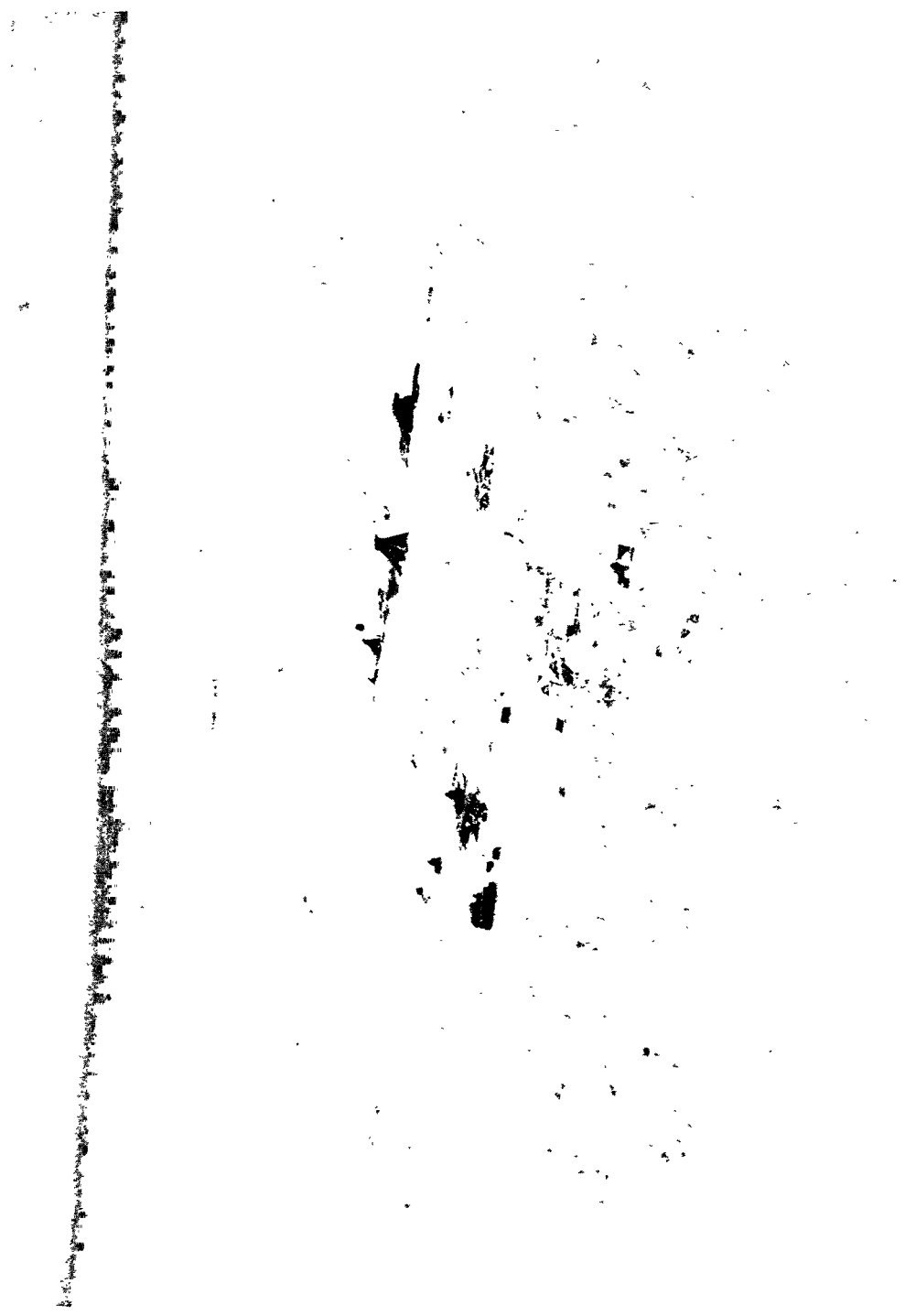


PLATE 11.—Chichen Itza.

We were met at the dock by General Trevino and other officials, who furnished us with most hospitable entertainment including the famous Mexican drink "tequila" — of which a little goes a long way — and a most lavish dinner, followed by a display of rockets and then a dance, attended by all the unmarried women of the village and all the men and boys of every size and age. The women of these people marry at about fifteen and thereafter are not permitted to take part in public entertainments, so that the eligible partners at the dance were rather youthful. Our party were introduced to various members of the fair sex in their early teens, but being unfamiliar with the music and their style of dancing, could not compete with the local talent. Two flashlights of the dance hall were taken while the ball was in progress, but unfortunately they did not develop very well. The night was spent in the town in quarters generously furnished us by General Trevino, as there are no sleeping accommodations at the airport of the Pan-American Airways Company. A five-inch scorpion picked Dr. Mason as a sleeping partner sometime during the early hours, but apparently appreciated the latter's hospitality as it did not attack him.

We returned to the airport the next morning, December 4th, in the customs' launch and left the lagoon at 10.55 A. M. We first tried flying over the sea with only one engine. The right motor was cut off at about 1200 feet altitude with the plane carrying a full load of 3200 pounds. During the next ten miles the plane settled down to an altitude of about 250 feet, and then held this level indefinitely. At 11.05 the mainland was reached directly over the Indian village of Playa Carmen, which contains six to eight thatched huts near some ruins a few hundred yards away, known by the same name. From this point we flew south, very low and along the edge of the ocean to examine the coast carefully for ruins other than those now on existing maps. This part of the east coast of Yucatan contains a succession of small ruins first located by the Mason-Spinden Expedition of 1926. Paalmul, one of the largest, with an Indian village of the same name, is shown on Plate 8. The sites, as described by Gregory Mason in his very interesting popular book on that trip, run along the coast "like the towns along the Connecticut shore."¹ The shore line was scalloped, and a low ridge ran parallel to the sea about three quarters of a mile back from the beach. [Plate 9.]

For more than half an hour the flight led south, past forgotten temples and desolate altars, lonely relics of a lost religion, until at 11.45 the expedition reached the well-known city of Tulum.² These ruins, perched on the edge of precipitous cliffs, showed up magnificently from the air across the brilliant blue of the sea sparkling in the flaming light of the noon-day sun. [Plate 10.] As this site has been cleared and thoroughly examined on several

¹ *Silver Cities of Yucatan*, pages 265, 266 (Putnams).

² See *Tulum, an Archaeological Study of the East Coast of Yucatan*, by S. K. Lothrop.

occasions, no landing was made but several photographs were taken of the ruins and the course was then continued to the south. The ridge a little way inland, running parallel to the sea, disappeared at Tulum. The country west from the coast while nearly flat, was in general higher above sea level than before, and a very definite low plateau ran north for some distance in the direction of Coba. Like the rest of the country in Quintana Roo, all this area is densely covered with trees, scrub and vegetation.

At 12.15 the plane reached Muyil, a large site, also discovered by the Mason-Spinden Expedition of 1926. Its high tower showed up very plainly through the vegetation, but none of the other numerous ruins of this rather important city were visible. From Muyil, a southern course was taken along the shores of two near-by lakes connected by an ancient Maya canal, but no signs whatever of ruins were found, and five minutes later the plane headed north for Coba on a course about twenty-five miles inland. As the map shows, this region between Muyil and Coba was not covered by the Lindbergh-Carnegie Institution flight of 1929.

The visibility on this course was poor; great masses of cumulus clouds cast heavy shadows on the jungle and made it difficult to distinguish elevations except when flying just above the treetops. This is too hard on the nerves to continue for more than a limited space of time and the average altitude of the plane was about 1000 feet with occasional dips to the lower level. No ruins were seen between the lakes near Muyil and Coba, although it is almost certain that some exist in the dense scrub of this region.

Just south of Coba several dried up lakes and small "cenotes" or natural water holes, covered with scum, were plainly visible from the air. A large crescent-shaped lake was seen at the southern edge of the site of Coba. This lake had completely dried up in very recent times and is probably one of those reported previously as part of the Coba Lakes group. Coba itself was reached at 12.45 and again the expedition tried without success to see the causeway running west. The other causeways seen on the previous day showed up plainly. We flew down very low over the northwest and largest lake, almost touching the water, but Captain Ormsbee again declined to land for reasons already given. In order to measure the size of the two largest lakes by airplane speed, we flew lengthwise over both of them in each direction. On an average of the two courses the northwest and largest one was covered in seventeen seconds, the second one in fifteen seconds. Assuming an airplane speed of one hundred land miles an hour, which is almost the equivalent of eighty-five nautical miles, the northwestern and largest lake is about 2500 feet long and the other lake 2100 feet. A new hut, used by several recent land expeditions and probably built by one of the Indian chicle gatherers of the province, was seen on the north shore of the largest lake. The natives living there waved at the plane as it circled above them.



PLATE 12.—El Castillo, or the Temple of Kukulcan. Chichen Itza.

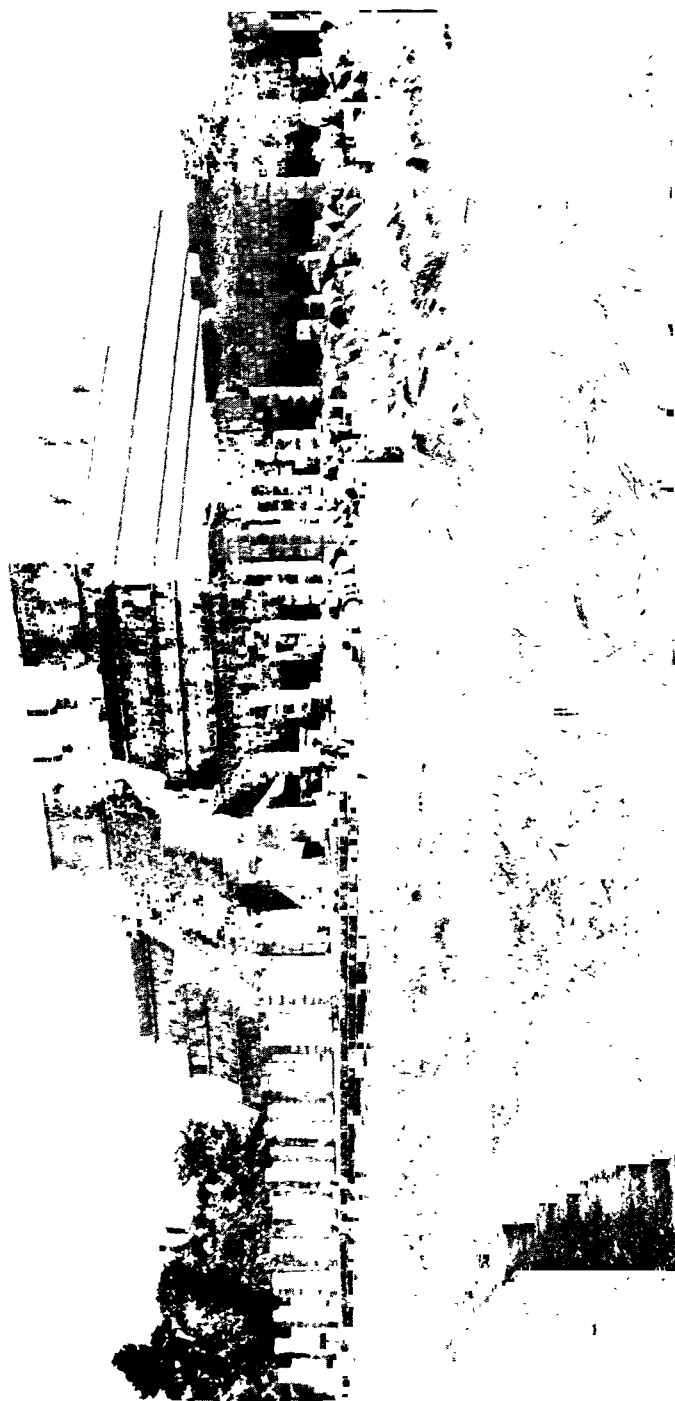


PLATE 13. The Warriors' Temple, Chichen Itza

At 1.16 the plane left Coba for Cozumel, flying on a 90 degrees course due east to find where it would intersect with the island. At 1.36 the coast was reached, a total of twenty minutes from Coba to the sea in a direct line to Cozumel Island or a distance of about twenty-five nautical miles, after allowing for a head wind estimated to be at least ten miles an hour. At 1.46, still flying on the same course due east from Coba, the western coast of Cozumel Island was reached about nine miles north of the southern tip. This confirmed our previous calculations. At 1.54 the plane landed again at the Cozumel Island Lagoon airport, after three hours of flying for the morning's work.

In the afternoon the expedition left the lagoon at 3.15 and again headed for Coba at an altitude of about 2000 feet on a bearing of 260 degrees. At 3.31 we crossed directly over a very broad trail running northwest and southeast in a straight line as far as it could be seen. This road or trail is about twelve miles inland and does not go toward Coba. It is undoubtedly a modern native trail, probably running from Tancah on the coast to Chemax, near Valladolid. At 3.49 Coba was reached, which again checked closely with previous bearings on its position, allowing for difference in altitude, starting position and wind drift. At 3.51 we left after locating faint traces of what was believed to be the east and west causeway running nearly seventy miles west to Yaxuna, a town south of Chichen Itza. A considerable part of this causeway has been covered on foot, and we hoped to fly over its entire length, as it seemed a most likely area in which to find new ruins. For a few minutes we succeeded in flying along the line where this thirty-foot-wide causeway lay on the ground. Thereafter traces of it showed up faintly now and then, but finally disappeared altogether.

At 3.55 a clearing was seen with six or eight Indian huts, Chemax being off to the north with its church tower showing very plainly. No ruins at that time could be seen straight ahead in the direction of the causeway, which was still invisible, but some suspicious looking mounds appeared a little to the northeast of Valladolid, so the course was altered and the mounds reached about four o'clock. [Ruin A, map.] While no masonry was observed, the arrangement of these mounds and their curiously artificial shapes suggests that they may be new ruins, as none are shown here on any map. This site is so near to Valladolid, however, that if the mounds are artificial it is curious they have not been reported before. Leaving these mounds, the plane flew southwest until 4.11 when it headed west toward Yaxuna. From then on our course was parallel to the line of the reported causeway as it showed on our maps, but we could not pick it up. A large tract of the country below was very swampy and covered with unusually dense forest. There were also a number of slight irregularities in this area, some of which were examined but found to be either clumps of trees or simply natural elevations.

At 4.28 the plane was over an Indian village, which Mr. Smith photographed. The course was still on a line for Yaxuna, which had not been found at its map location. At this village an old Spanish building near some Indian huts was plainly visible from the air. If this is Yaxuna, as is believed to be the case, it is at least eight miles west of its charted positions on the maps, and the old causeway from Coba is correspondingly longer than previously supposed.

At 4.40 the superb city of Chichen Itza was reached, where Mr. Smith took several air photographs. [Plate 11.] These famous ruins showed up beautifully, especially the Temple of the Warriors and the Castillo, and are an enduring monument to the splendid work of Carnegie Institution and Dr. S. G. Morley and Mr. Earl Morris in excavating and restoring its temples and palaces for the benefit of posterity.¹ We did not fly low enough to get close-up pictures, but as a matter of interest to those desiring to see details of the wonderful work of the Mayas, photographs of the Castillo, which is 110 feet high, and of the Temple of the Warriors, taken at another time from the ground, are shown in Plates 12 and 13.

At a quarter of five we left Chichen Itza for Merida. At five o'clock the remains of the very high stepped pyramid of Izamal, the highest ancient structure known in Yucatan, were plainly visible away to the north. At 5.28 the plane finally landed at Merida, the capital of the state of Yucatan. Here the expedition was met by a large assemblage of government officials, newspaper representatives and photographers, and Senor Fernando Barbachano, the owner of the Mayaland Tours Agency and a friend of the writer's as a result of a previous visit to this city. The afternoon's flight lasted two hours and a quarter, or a total of five hours and a quarter in the air for the day.

After being photographed at the landing field, the expedition went to the excellent Gran Hotel and were interviewed by the press who gave us a most favorable write-up. We were later entertained at dinner by the writer's friend, Senor Barbachano, in his home and afforded a very good illustration of the pleasant life of the Yucatecans at Merida, their courtesy and hospitality, and the excellence of their local foods.

Merida, a beautiful clean city of 80,000 people, with its houses colored pink or white or light blue, is the principal city of the peninsula of Yucatan. Its inhabitants are nearly all Maya Indians of almost pure stock, immaculately clothed in picturesque white suits which are kept spotlessly clean. There is also an upper stratum of Mexican officials and administrators, and an aristocracy of Spanish descent. Merida was founded in 1542 on the site of the ancient Maya city of Ti-Ho, and its principal residential building has

¹ For an interesting popular account of the work of Carnegie Institution at Chichen Itza, see *Digging in Yucatan*, by Ann Axtell Morris, Doubleday Doran, 1931, with many illustrations.



PLATE 14. Usual

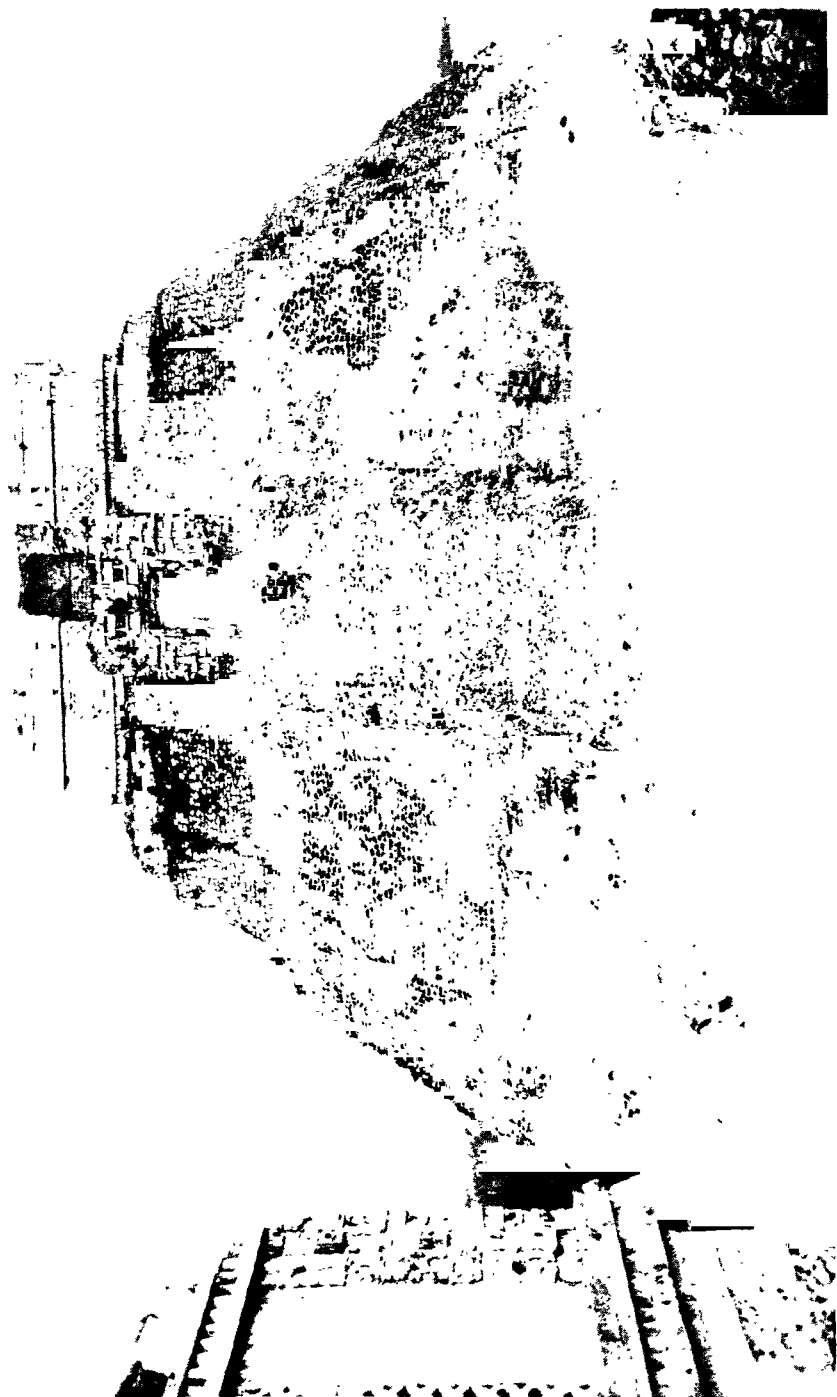


PLATE 15. The House of the Dwarf, Uxmal.

been occupied continuously since 1548 by the lineal descendants of Francisco Montejo, the conqueror of Yucatan. It was a well-known and important city in the Western Hemisphere seventy-five years before the Mayflower ever reached Plymouth Rock.

From Merida as a center, a government-owned railway runs some twenty-five miles north to Progreso, the principal seaport of Yucatan. The Ward Line boats from New York touch here on their way to Vera Cruz and the Munson Line from New Orleans maintains a weekly service in the winter season. Other railroad lines run from Merida east to Valladolid, south to Tekax and Peto and southwest to Campeche, a seaport and the second largest city in Yucatan.

At Merida is collected the henequen fibre which constitutes the principal and most important product of the state of Yucatan. This is made from the leaves of the agave cactus and is exported through Progreso in great quantities under the name of "sisal." It is used principally to make binder twine for harvesting machines and other purposes, and, until very recently, north-west Yucatan was the only source of this material.

The city possesses at least two comfortable hotels with good food and running water in many of the rooms. It is about 100 miles by land from the ruins of Chichen Itza where a small modern hotel has recently been erected, and perhaps half that distance from the equally impressive ruins of Uxmal. It has a large and beautiful public square in the centre, its streets are as clean as those of Paris, and the principal approach by road from Progreso is a long beautiful avenue comparable to the Champs Elysees. Merida contains a wonderful museum with many superb examples of the work of the ancient Maya and the city is well worth a visit during the winter season. It is also the center from which to start for all the best known and best preserved ruins of the Maya civilization in Yucatan.

The next morning, December 5th, some of our party called upon Dr. Martinez, of Merida, one of the leading authorities on the Maya civilization.¹ Later we gathered in the house of a friend of Senor Barbachano and were introduced to a forester of the Mexican Government, with whom we discussed the prospects of finding some hitherto unexplored ruins in the adjacent region near any body of water large enough for our plane to land on with safety. According to the forester, the only hitherto unexplored site of any size within available distance from Merida was a two days' journey by mule from a lake on which the plane would have to land. This body of water in turn was far from any settlement, requiring that arrangements be made ahead for us to be met by men and animals who would have to come from another settlement some twenty miles away. The forester said he could attend to

¹ Dr. Martinez has recently compiled a complete Maya-Spanish dictionary, published in Merida in 1930.

all these details, but the whole project, especially the size of the ruins and the location of the lake on which we were to land, seemed so uncertain that we decided not to try it.

The forester then told us that he had been all over most of the states of Campeche and Quintana Roo, except the southeastern portion of the latter state around Bacalar. He described several groups of hitherto unknown and unexplored ruins (one very large indeed, almost as large if not larger than Chichen Itza, which he had seen in the jungle in the southeastern part of the state of Campeche between the Mamentel and Candelaria rivers, not far from the border of Guatemala) and offered to lead an expedition there if he had some days advance notice. It would apparently take about a week from Merida to get to the spot by land via Champoton, Silbituk and Bonfils, or San Felipe, the latter near the Guatemalan border. Dr. Mason made careful notes of this for possible future use. One of these large groups of ruins in southeastern Campeche as described by the Mexican official covered almost two square miles and some of the structures were from eighty to one hundred feet high and others very long and broad. No ruins have been reported from this particular area and the style of architecture is likely to be new. Unfortunately, there is no place within many miles of this zone in which a plane could come down and take off, so that the whole trip would have to be made by land. This made it an impracticable project for the present expedition.

After a light luncheon, the party left Merida at 1.56 for Uxmal, central Yucatan and Carmen. As soon as a little altitude was reached we could see ahead of us to the southwest a low range of hills, the first elevation of more than a few feet observed since arriving in Yucatan. This range ran apparently southeast and northwest and some of the hills were nearly a thousand feet high. In ten minutes' time we were over these hills and could see the town of Muna below and to the south of us.

At 2.18 we arrived at Uxmal, which is situated in a rolling broken country running almost due north and south as far as the eye can see. This great city is a splendid sight from above. The House of the Dwarf and House of the Governor show up splendidly, and the Doves and high truncated pyramids near by are far more impressive than when seen from the ground. Moreover, from the air many smaller ruins and mounds are visible in the surrounding scrub which apparently have neither been discovered nor described.

A large "aguada," or water hole, lies about a mile away to the west of the House of the Dwarf, and several pools of water and "cenotes" (or natural wells) about a quarter of a mile south of the Nunnery quadrangle, evidently the chief sources of water supply of the ancient inhabitants. The plane circled around this site several times and we obtained some excellent photographs from various directions, although the ruins were usually under shadows of clouds. [Plate 14.] The House of the Dwarf, which is 100 feet high, and

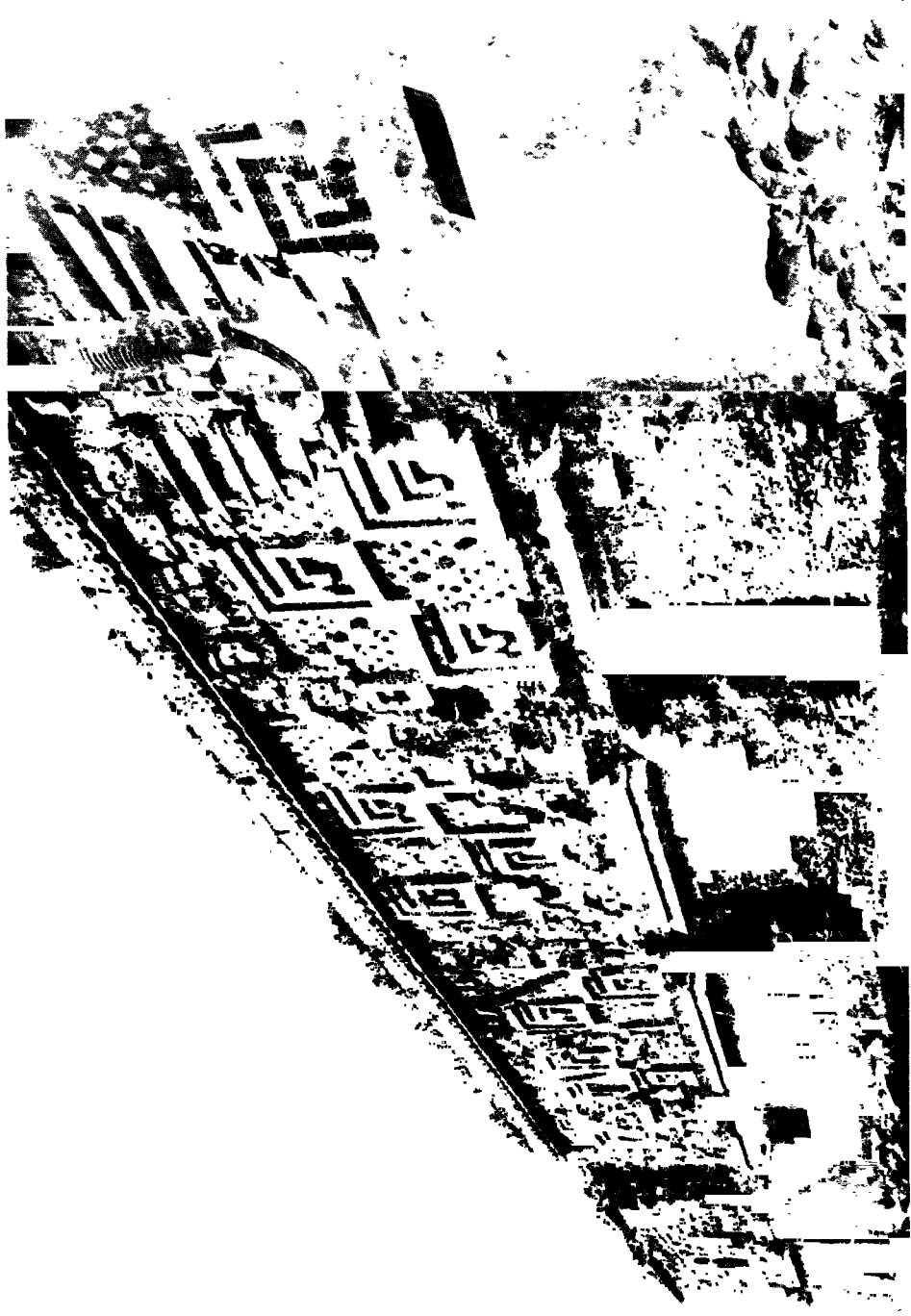


PLATE 16. The Governor's Palace, Uxmal.



the House of the Governor, which is 320 feet long, as photographed from land on another visit, are shown in Plates 15 and 16 to illustrate some of the details of Maya art and architecture. The great square group of buildings called "The Nunnery" which is believed to have been the home of the vestal virgins, has been carefully studied, measured, and photographed by an expedition from Tulane University under Mr. Frans Blom, and these beautiful examples of early American art will be reproduced in their original construction and color at the World's Fair in Chicago in 1933.¹

About 2.25 the plane left Uxmal (which is placed nearly half a mile too far east on the existing maps), and flew southeast over very broken country with low hills and ridges showing far ahead. Another range of low hills ran almost due south. In less than five minutes we arrived at Kabah, having seen many small ruins en route. Several photographs were taken of this city whose four large buildings were strikingly visible in the clearing around them. [Plate 17.] The country ahead was very broken and lumpy so that it was hard to tell from the air the difference between real and artificial mounds. A few minutes after leaving Kabah we reached and photographed Labna, which has a very impressive pyramid with an extremely high roof comb, and a large building with many doors. Like Uxmal and Kabah this site also has been cleared out by the Mexican government, and its ruins stand out sharply from the heavy forest surrounding them. [Plate 18.]

At 2.41 the plane left Labna and started southeast toward Lake Chichancanab, which, as shown on existing maps, lies in the very center of the peninsula of Yucatan. The Lindbergh-Carnegie Institution flight of 1929 missed this lake, but found another one south and a little east of the map location of Chichancanab which the natives called Payegua. It was our hope to locate Chichancanab, which from the maps appears to be at least ten miles long, and to examine it carefully for ruins. Only one site — Elemax — is shown on any maps to be situated on its shores. Except for cloud shadows, the visibility was very good and the country below, at this time, was a mass of broken hills and full of small ruins, all probably well known and not worth photographing from the air.

Fifteen minutes southeast of Labna the country was still broken, but the elevations were much lower. A lake far to the left, or northeast, was dimly visible. By 3.10, or about fifty miles southeast from Labna, the broken country had disappeared and the land ahead was nearly flat. In a few minutes more the plane was over what appeared to be a very large lake which had long ago dried up. Low vegetation could be seen on the bottom levels, and small elevations covered with higher trees rising here and there from this low-lying area were probably islands in the past when the lake was full.

¹ *Uxmal: The Great Capital of the Xiu Dynasty of the Maya*, by Frans Blom, *Art and Archaeology*, December, 1930, Vol. XXX, No. 6, illustrated. See also *Science News Letter*, May 9, 1931, pp. 298 to 300, illustrated.

At 3.20 to the left rear, or northeast, and about fifteen miles off, the writer saw a long, thin patch of blue shining in the sun, but Captain Ormsbee did not think it was a lake. None of the other members of the party noticed it. At 3.22 the plane was about where Lake Chichancanab should have been according to compass bearings and map position, but no sign of it was visible, except a large swampy area. The plane was flying at about 1500 feet altitude, with good visibility, and there was no sign of water in any direction. During the next ten minutes we flew low over a region filled with dried up water courses which may have been rivers or lakes in the distant past, with patches of grass on the low ground and here and there the same sort of elevations covered with trees which may once have been islands. Some of these areas were ten to twelve miles long and quite wide. Any lake previously reported almost in the exact center of the peninsula of Yucatan is now dried up and Lake Chichancanab must be at least fifteen miles farther to the north or east than its position on any of the expedition's maps.

By 3.30 we had reached a region full of long shallow depressions. A small lake at least a mile in length and partly hidden by a low ridge was visible to the southwest, and various small ponds and bodies of water showed up dead ahead. This kind of country continued for the next ten minutes or thirteen miles, at the end of which, at 3.41, the plane was over a narrow lake, perhaps two miles in length and about two hundred yards wide, which was quite deep. [Plate 19.] This body of water was evidently not Lake Chichancanab as it was much too far south and east, and could not be Lake Payegua where the Lindbergh-Carnegie Institution flight landed, as it did not contain any islands, several of which were found in Payegua. It is at approximately latitude 19 degrees 10 minutes N., and longitude 88 degrees 40 minutes W., a place where no such body of water is shown on any map, and is probably a new discovery. The plane could have easily landed and taken off anywhere on its surface, but no signs of ruins were seen along its shores so no landing was attempted.

To the south and east were numerous other larger lakes, one especially very long and crescent-shaped, with other bodies of water north and west of it. In our search for Lake Chichancanab we had come much farther to the southeast than originally planned so that these distant lakes, particularly the crescent-shaped body of water, were judged to be the lakes around Bacalar. The flight of a week later north from Belize showed this opinion to be correct.

After finishing the examination of the new and unknown lake, the plane rose to an elevation of 5000 feet and at 3.50 headed for Carmen, our destination. Our gasoline was running low and it was decided to go there by the most direct and quickest route.

The southeast-central part of Yucatan covered by our flight, including an area at least twenty miles south and west of the new lake above mentioned,



PLATE 18--Labna.



PLATE 19. -- Unknown Lake -- Latitude 19° 10' North; Longitude 88° 40' West, East Central Yucatan.

is nearly all flat, low-lying ground, and from above, it is evident at once that the whole region slopes south and east toward the sea near Bacalar. According to the Carnegie Institution observers, for many miles to the north the country is apparently of the same general character, except that there are fewer dried up water courses and many more ponds and lakes.¹ From the number of large dried up water courses in this area, it is likely that in the past, possibly during the time of the Maya civilization, the country was even more swampy than it is today. As it is uninhabited at the present time and as no signs of ruins were seen, it seems probable that during the rainy season most of this region has always been so wet as to be unfit for human habitation.

It is a curious fact that the Maya peoples very seldom erected any cities on or near the shores of lakes, Coba, Elemax and Muyil in Yucatan, and Yaxha and one or two others in the southern area, being notable exceptions. The sites erected on the edges of rivers are also few, the overwhelming number of the Maya cities being found in regions where the people must have relied upon artificial reservoirs for their water. Whether or not their aversion to the shores of lakes and rivers was due to fear of floods or based on a religious belief in the sanctity of rain water, are unsolved problems today. Perhaps both elements played a part, but in any event, our expedition further confirmed the general belief that it is hardly worth while to search for large ruins near the shores of any good sized body of water in the Maya area. We saw none in the lake area of Central Yucatan.

This region of flat low-lying land and dried up river beds and lakes interspersed with various ponds and swamps continued for perhaps thirty miles west-southwest from the new lake, until about 4.10. At this time the country below showed several long ridges or escarpments running nearly north and south and in the distance ahead there appeared the same broken country which was found around Uxmal. For the last one and a half flying hours, or at least a hundred and fifty land miles of distance with a lateral visibility of an average of perhaps thirty miles, not a sign of human life, not one thatched hut or single little clearing, was seen in the area visible from the plane, which must have been between 4500 and 5000 square miles.

At 4.20 the plane was once more over the broken hilly country in the west. This band of rolling ridges and hills running down the peninsula from the north continued as far south as could be seen from an altitude of 3000 feet. At 4.23 we passed just to the south of, and perhaps three miles away, from a small "aguada" near which were several very suspicious looking mounds. Their shape seemed artificial, with light patches on them which might have been stone work. Unfortunately, as already pointed out, the long search for Lake Chichancanab had taken most of our gasoline and consequently no detour could be made to examine these interesting elevations.

¹ *Geographical Review*, April, 1930, pp. 190-1.

Ten minutes later we passed to the north of and about five miles away from another group of mounds, two of which resembled enormous flat topped pyramids covered with vegetation. The country here was very broken and these may or may not have been natural hillocks. Five minutes farther on a clearing and a small road were plainly visible, the first sign of habitation or human life seen since leaving Labna. The ridges and hills in this region near the road and clearing were full of steep mounds toward the south but we could not investigate them and it is possible that some of them were large ruins. Many ruined sites are marked in this general area on the Blom-Ricketson-Spinden maps.

At 4.50 the plane passed just south of a town on a clearing near a small lake and at 5 p. m. was between a lake to the north with an island and an Indian settlement of several huts on its west side, and a long narrow lake or swamp to the south with still another shallow body of water beyond. According to later information the island in the lake may have been Isla Sagrada and the settlement the village of Silbituk, but this is not certain, as if so, these places are very much nearer the shore of the Laguna de Terminos than their positions on the maps indicate. At 5.10 the blue salt water of the Laguna de Terminos appeared far ahead — a most welcome sight — and an Indian village in a good sized clearing was visible to the north. A few minutes later it began to rain hard a short distance away to the south of our course. In the southwest the sun was low on the horizon, and shining through the rain made a wonderful golden veil hanging far across the skyline and trimmed with beautiful fringes of purple and amber and white.

At 5.27 we reached the lagoon a little way north of the mouth of the Mamantel River. From this point the Laguna de Terminos is apparently about forty-six miles across to Carmen instead of nearly fifty-two miles as shown on the Blom-Ricketson-Spinden maps. At 5.56 the plane landed at the Carmen field, having covered on this trip approximately 386 land miles in just under four hours flying time.

Mr. Moore, resident manager of the Hearst concessions in Campeche, and Mr. Shumacker, manager of the Campeche holdings of the Laguna Corporation, a chicle company, both friends of Dr. J. Alden Mason, met us at the field and took us in their cars to hotels at Carmen. The port of Carmen is the gateway for all traffic in mahogany, cedar, logwood and chicle coming down the rivers flowing into the Laguna de Terminos. This little town of perhaps 7500 inhabitants supports a few trolley cars which apparently are named after the lady loves of the officials, as the paint on the ladies' names on the sides of the cars is much fresher than that on the rest of the surface. The streets are narrow and the natives drive their motor cars so badly that after several narrow escapes we all longed to be back in a good, safe airplane. The bridge over a little stream between the airport and the town cracked



PLATE 20. —The Usumacinta River north of Tenosique.



PLATE 21. The Usumacinta River near Piedras Negras.

badly some time ago. Instead of repairing it, which would cost money, a soldier has been posted to compel all passengers in vehicles to get out and cross on foot, and the vehicles to follow them at a snail's pace.

On Wednesday morning, December 6th, the plane left the Carmen airport at nine o'clock for the valley of the Usumacinta River and by 9.15 had crossed the lagoon headed south-southeast toward Tenosique. During the next twenty minutes the country below was full of swamps and marshes with sparse vegetation and scattered low clumps of trees. Two deer were started up by the plane in this area and a few minutes later a small flock of large pink-colored birds which were either reddish egrets or pink flamingoes. The thirty miles of country southeast from the edge of the lagoon is so low and swampy as to be almost uninhabitable for any large number of people, and it seems unlikely that any important ruins will be found in this region.

Santa Ana, at the intersection of the San Pedro and the Usumacinta rivers, was reached at 9.45. Captain Ormsbee landed the plane very skillfully on the latter river, after forty-five minutes flying time from Carmen. The anchor was dropped and Dr. Mason went ashore in a dugout canoe which worked its way out to the plane with difficulty on account of the swift current, flowing at about ten miles an hour. Dr. Mason's visit was for the purpose of inspecting some equipment he had purchased in connection with the Museum's expedition to Piedras Negras farther up the river. He was ashore nearly two hours on this mission. In the meantime the rest of us stayed in the plane, Mr. Smith fishing in the muddy water off the stern with no success. From time to time heavy logs came down the river moving very fast in the rapid current. Finally one of them struck the right forward pontoon and dented it seriously but luckily just missed breaking it, as such an accident would have ended the expedition then and there.

At ten minutes of twelve the plane took off from the river and headed for Tenosique. For the next few minutes the country below was a series of swamps, marshes and creeks with a few scattered fields, and was practically uninhabited except along the river banks. The river here and lower down is a maze of bends and turns, which is remarkable in view of the swiftness of its current. [Plate 20.] At noon a slightly higher country covered with tropical jungle was reached and Tenosique was in sight dead ahead. A minute or two later we were over the town. The inhabitants, men, women and children, ran out and waved at the first airplane most of them had ever seen, while horses, mules, dogs, pigs and chickens ran frantically into the forest, terrified by the roar of the motors. At 12.06 we landed on the river just opposite the town, after one hour in the air from Carmen, covering in this time a distance which took Dr. Mason last year five days to travel in a river steamer.

A number of dugout canoes, heavily laden with natives, came out to the plane after the anchor had been dropped in the fast flowing current. Two of these collided just off the stern of the plane and one upset, all its passengers falling into the swirling brown water. We were afraid that some of these poor natives could not swim and might drown before our eyes although there was nothing we could do to help them. The other dugout, however, somehow managed to rescue the upset passengers, although it was apparently overcrowded to start with, and the unfortunate owner of the capsized canoe saved himself by clinging to it and finally drifted ashore. A very good moving picture of this entire incident was taken, as the camera was trained on the dugouts just before the collision took place. Dr. Mason went ashore to meet another of his agents in charge of some other work for the Piedras Negras expedition and returned in about an hour and a half. The balance of the expedition did not feel inclined to risk the dangers of the dugouts, and dozed on the lower wing of the plane.

After considerable difficulty in getting up the anchor on account of the depth of the river and swiftness of the current, we finally left Tenosique at 1.55 for the upper reaches of the Usumacinta. Eight minutes later the plane was above the spot where the river breaks through the mountains to the plains and at 2.18 had reached the site of Piedras Negras, one of the most famous of all the First Empire cities, where the Museum's expedition is now successfully settled. Unfortunately, these ruins could not be seen from the air on account of the thickness of the vegetation and the steepness of the sides of the river. [Plate 21.] No plane could land safely on this part of the Usumacinta on account of the swift current, and even if it did come down successfully, it is doubtful if its anchor would hold. Moreover, the plane would probably be wrecked against the shore while the anchor was being lifted before taking off. It might, however, be possible to land safely a short distance above Piedras Negras during the dry season when the current is not so swift, if a ground party had previously constructed in the river strong moorings similar to those used by boats in harbors, which the plane could cast off at the exact moment it was ready to taxi away. This would save many days in the trip from Carmen to the site. The opinion of an expert pilot at the time and under the conditions of the proposed landing should be obtained before any final conclusion can be reached as to the possibilities of using a plane at this location.

From just south of Tenosique all the way up to Piedras Negras the river runs in a tremendously deep and narrow gorge between wild and broken limestone hills. The tropical forest on all sides was magnificent; everywhere great masses of flowering creepers and trees, larger, and of a much deeper green and denser foliage than the Yucatan jungle. Beyond the gorge to the northeast the flat delta region of the river stretched for nearly a hun-



PLATE 22.—The Gorge of the Usumacinta River, south of Tenosique.



Fourchild Aerial Surveys, Inc.

PLATE 23.—The Usumacinta River at Yaxchilan.

dred miles to the sea. The grandeur of the setting beggars description. [Plate 22.]

At 2.42 we reached the extraordinarily shaped bend in the river at Yaxchilan (Menche) where the Usumacinta makes a turn as abrupt and sharp as the closed end of a hair pin. The gorge of the river continued to this site, but here its sides were much lower and flatter. The pilot dropped the plane well down until it was not more than 50 feet above the water, and the ends of the wings were about 75 feet from the vegetation on either side. At this level we flew completely around the whole bend of the river past the site of the large and well known ruins of Yaxchilan. [Plate 23.] The tropical vegetation, trees, vines and creepers, formed so dense a curtain that not a single portion of the ruins, or the slightest vestige of any masonry could be seen. Low elevations which might have been natural were plainly visible, but nothing which could be clearly identified as artificial structures, even when we knew exactly where they were, not more than a hundred and fifty feet away. This experience convinced all of us that it is nearly impossible to find from the air any new sites in a country of a broken and densely forested character.

At 2.45, having completed the flight around the bend of the river, the plane rose above the hills and started to find Lake Petha which was placed in several different locations on our maps. In about five minutes we passed south of a very large lake which must have been Lake Anaite, visible through intervals in the clouds surrounding us at that time. Ten minutes later fields and small ponds could be seen well to the south, and to the southwest the valley of another river almost parallel with the Usumacinta and ultimately running into it. Between 2.55 and 3.10 the plane flew over an extraordinarily broken and pitted country which resembled gigantic shell holes in a giant "No Man's Land," with patches of white limestone cliffs showing in many places through the tropical vegetation. For the most part, this wild and jagged region was covered with high green flowering trees, interlaced with vines and creepers of every description. Numerous small lakes were seen in this area and in the country to the northeast. All of this region is a blank space on the maps of the state of Chiapas, Mexico, and is commonly known as the land of the Lacadone Indians and also as *El Desierto*, or "The Desert."

About 3.14 we arrived at a good-sized lake in the mountains which was almost certainly Lake Petha, as it was found in the position given for it on the Blom-Ricketson-Spinden maps. This body of water covered about a mile in each direction, with two long ends like fingers running to the northwest, which agrees with the description of Lake Petha. [Plate 24.] The plane flew very low, not more than a hundred feet above the lake or the surrounding shores, but we saw nothing resembling any ruins and only three

native huts at the end of one of the finger-like bodies of water mentioned. No natives were seen; they had either deserted the huts or what is more likely, had run away into the jungle, frightened by the noise of our plane.

At a quarter past three the plane left and headed northeast for Palenque. Small ponds were all around, and more lakes in sight straight ahead. At 3.22 we came to another lovely lake in the midst of the mountains, larger than Lake Petha, with high cliffs here and there showing their white limestone sides through the dense tropical vegetation. No traces of ruins or any signs of native life were seen on its shores. The altimeter just above the water registered 4000 feet. Far to the west, high mountains showed clearly on the horizon. They appeared to be nearly 10,000 feet high and were possibly part of the Cordilleras. This beautiful lake is located at about 17 degrees 9 minutes north latitude and 91 degrees 46 minutes west longitude. As it is not now marked on any map, it is believed to be a new geographical discovery and was christened Laguna Margarita. [Plate 25.]

A few minutes after leaving this lake, we passed a river flowing north on which a good-sized waterfall was clearly visible, and at 3.55 came out of the mountains and foothills and were above the plains with the town of Monte Cristo visible to the northeast. The ruins of Palenque were still some distance away. Their exact location in the hills was not known to any of us, and the pilot sent word that we had very little gasoline so that it was necessary for us to head immediately for Carmen. Photographs of this part of the Usumacinta delta were taken. [Plate 26.]

While large Maya sites of the First, or southern Empire have been found quite extensively in the river valleys in the area we had just covered, none have been discovered high up in the mountains of this region. Here the Mayas seemed to have preferred the foothills or the flat plains. On the other hand, the lake country we had just traversed is so broken into sharp ridges and pinnacles that it may not be suitable for agriculture, as the soil in cultivated places would probably wash off rapidly from the steep slopes in the rainy season. This supposition is strengthened by the fact that only three Indian huts and no fields were seen in the entire distance from Yaxchilan to Lake Petha and thence to the end of the foothills near Palenque, which included seventy minutes flying time, or a distance of about a hundred miles; and, with a visibility of fifteen miles on each side, covered an observed area of nearly 3000 square miles. No part of this region is marked on any map, and it is all apparently hitherto unexplored and unknown country.

On the way back to Carmen we enjoyed a most unusual and extraordinary sight. The sun was low down in the western sky and the plane flying at an altitude of about 4000 feet so that the sun and the plane were almost on the same level. A rain squall came up to the right and, as the plane was in the center of the cone of the sun's rays, the sunlight formed a per-

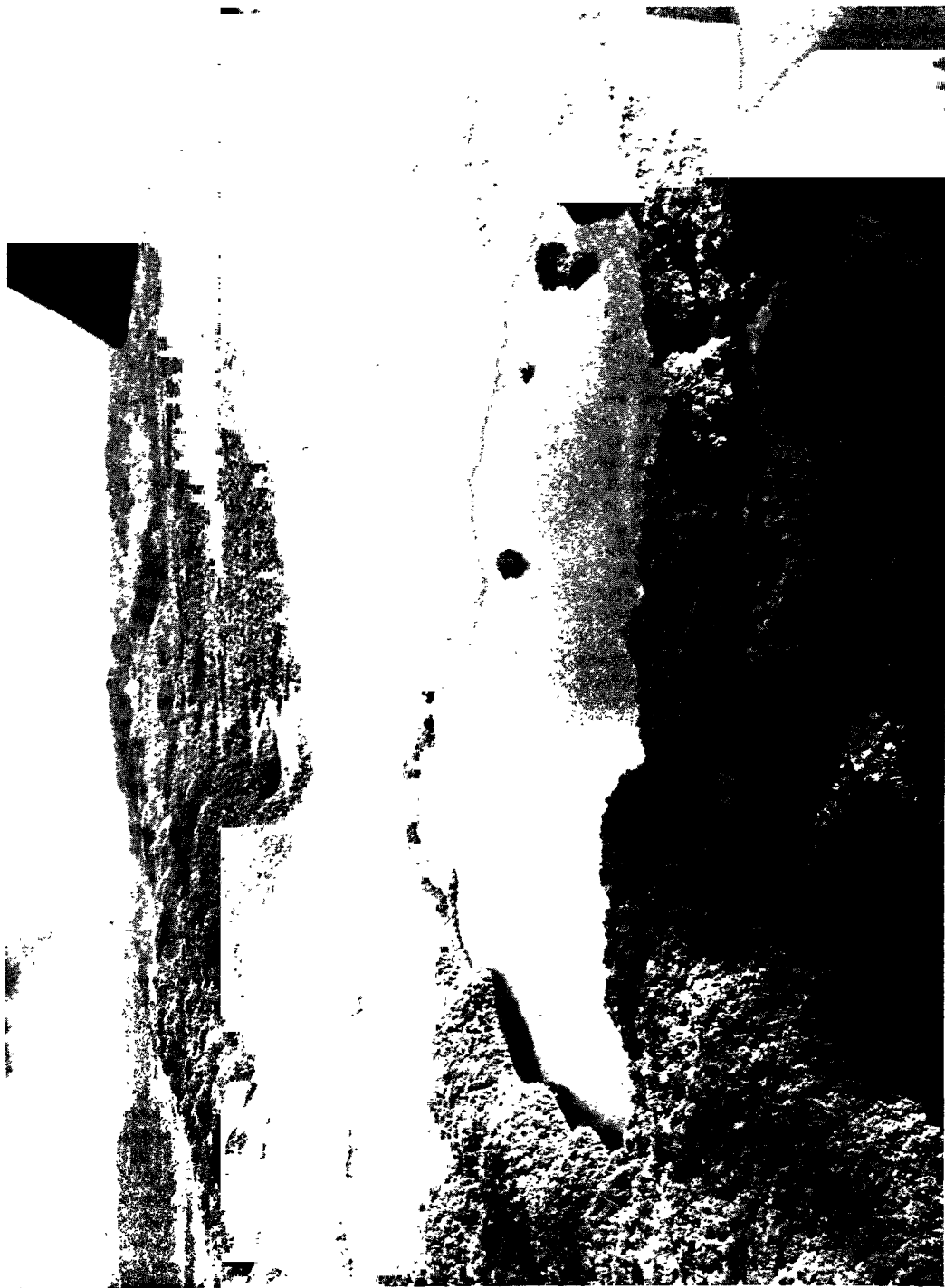
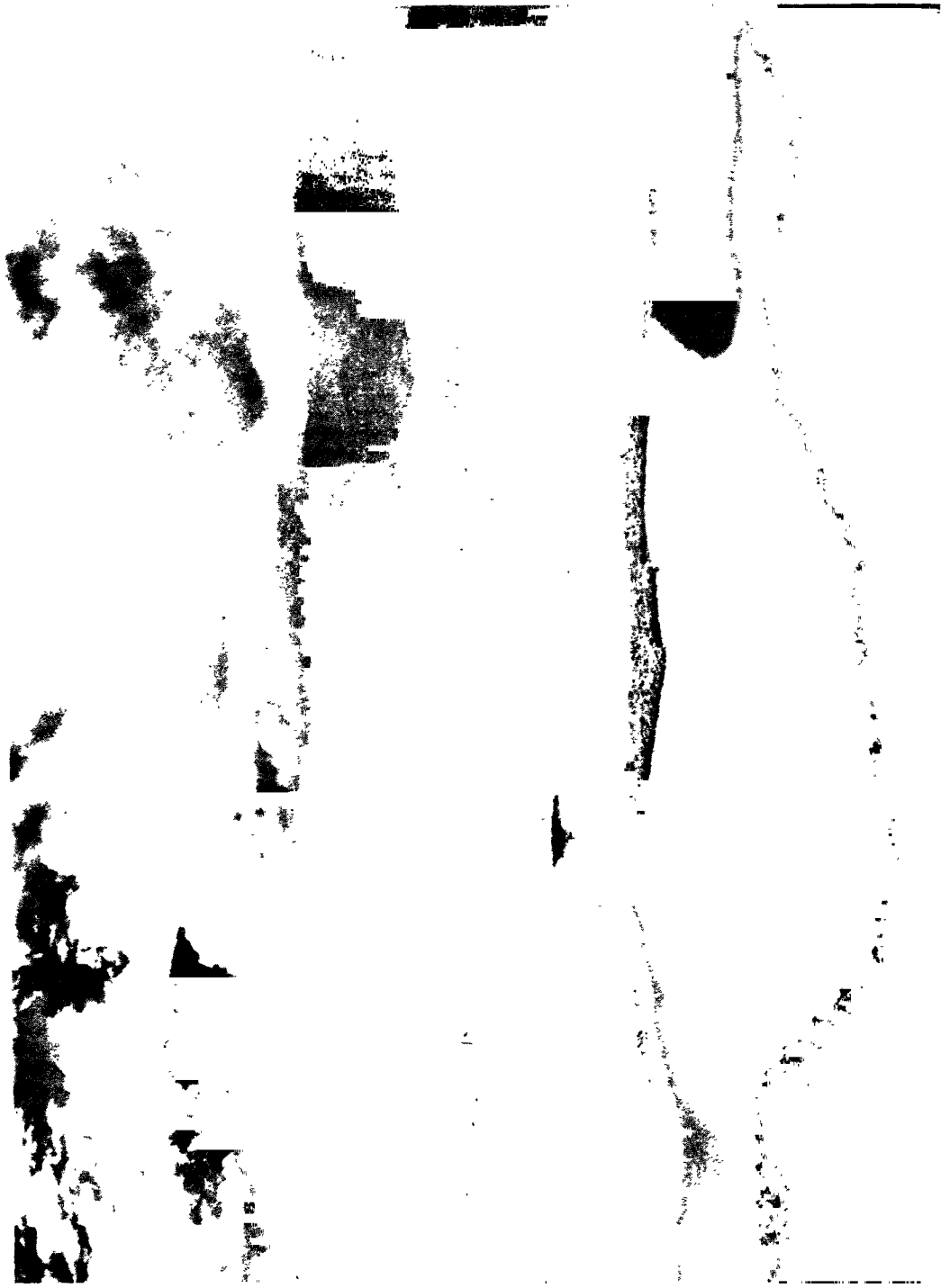


PLATE 24.—Lake Petha, Chihuahua, Mexico.



Firechild Aerial Surveys, Inc.

PLATE 25.—Laguna Margarita, discovered at Latitude 91° 46' West; Longitude 17° 09' North; Chiapas, Mexico.

fect circular bow on the falling rain. From its top to its base, which was well above the ground, and thence back to the beginning the tremendous circle of the iridescent rainbow hung in midair in wonderful shades of blue and crimson and gold. The plane finally landed at Carmen at 4.50, having flown three hours from Tenosique and one hour in the morning before reaching that town, or a total of four hours in the air for the day.

After dark some of us wandered around Carmen. The white coral beach and the sea were dazzling in the light of a brilliant full moon and the stillness was broken only by the splash of the little waves on the sandy shore and the sea breeze rustling in the fronds of the coconut palms. In the tropics, the stars seem closer to the earth than in the north and twinkle and shine with a brighter and softer luster.

That night Mr. and Mrs. Schumaker entertained Mr. and Mrs. Moore and our party at dinner. Afterwards, we discussed with Messrs. Moore and Schumaker, who are familiar with all this region, the most desirable country to examine in the future for unknown ruined cities. Both of them agreed that the most likely territory was in the southeastern part of the state of Campeche, near the source of the north fork of the Candelaria River, close to the Guatemalan border. It is interesting to note that their opinions on this subject coincided closely with the location of the new large ruins reported to us by the Mexican government forester, in Merida.

We rose early the next morning, December 7th, intending to visit and photograph the ruins of Palenque, one of the most famous of all the Maya cities. Not long after we had started, however, masses of mist came down from the mountains and made it impossible to see more than a little way ahead. It was obviously unsafe to fly toward high hills under such conditions and it was equally clear that so long as the mist lasted there was no chance of finding Palenque, so we reluctantly returned to the Carmen field, and, after taking on a full load of gasoline, left for Belize in British Honduras, at 10.50 A. M. The course was laid on a bearing of 120° straight across the base of the peninsula of Yucatan; a journey which as far as is known had never been made before. It covered country much of which had never been seen from air or land by white men, and we were very hopeful of finding something new, interesting, and important.

At 11.05 the plane had reached the land perhaps fifteen miles south of the mouth of the Candelaria River. To the east, the country was very flat and swampy with the Candelaria River winding in all directions. This low country continued for the next forty miles inland and appeared to be the same to the north and south of our course. It seems unlikely that any important ruins will be located in this area, the country being so wet and low as to appear unsuitable for any large number of people, but allowance must be made for the fact that we saw it just at the end of the rainy season. From

time to time between 11.05 and 11.30 we passed small scattered groups of Indian huts along the banks of the Candelaria River, never more than six or eight thatched roofs in any one settlement, some of which may be chiclero camps. About 11.30 when we were perhaps forty miles inland from the sea, the country began very gradually to rise. At that time a few low hills or ridges were visible around us, and occasional swamps in the valleys between them. A lake, about two miles long, running nearly east and west, lay perhaps four miles to the south, with marshes around its borders. The rest of the terrain at this time was covered with jungle as far as the eye could see. At 11.40 we were between the Candelaria and another river to the south, either the south fork of the Candelaria or possibly the Chumpan. The visibility was poor, the cloud level at about 1500 feet, and the plane flying at about 1100 feet altitude.

Five minutes later both rivers had disappeared, although according to the maps one or the other of them should have been visible. In all probability the river courses on maps of this part of the country are drawn entirely by guesswork and are meaningless, although it is possible the rivers had become so narrow by this time that the jungle obscured them. At 11.47 a clearing with eight thatched huts was directly below and a good sized pond or lake with two islands in it was visible to the north. The lake was perhaps one mile long, running north and south and the Indian or chiclero huts a little way off from the shores. Swamps and meadows were now very few and the trees and vegetation were nearly solid.

At 11.50 small clearings showed dead ahead and to the right and left; the region below being still fairly flat but with low hills or ridges perhaps ten miles to the north, and about fifteen miles to the south. The country was rising gently along our course to the east and we were flying at about 2000 feet, just under the cloud line. What looked like the cone of a volcano appeared on the skyline far, far ahead and a little to the south of our course, which was altered so that we headed for it. The elevation was so large and so distant that we feared it would prove to be a natural mound. At 12.02 and again at 12.05 we passed over small rivers or streams, and at 12.10 were at the mound we had seen twenty minutes or so before, or at least thirty miles away. This big mound turned out to be the largest of a group of four artificial elevations, almost at the summit of a ridge. Viewed from the northwest, a smaller mound rose immediately in front and a little to the right of the large elevation, and two others slightly larger than the second mound were still nearer us, one directly in line west from the big mound, and the other more to the south. [Plate 27.] We circled around these ruins and took several photographs of the large mound. Masonry was clearly seen in several places, and there is little doubt that this is the site of a really important new ruined city. The bush covered summit of the largest mound towered

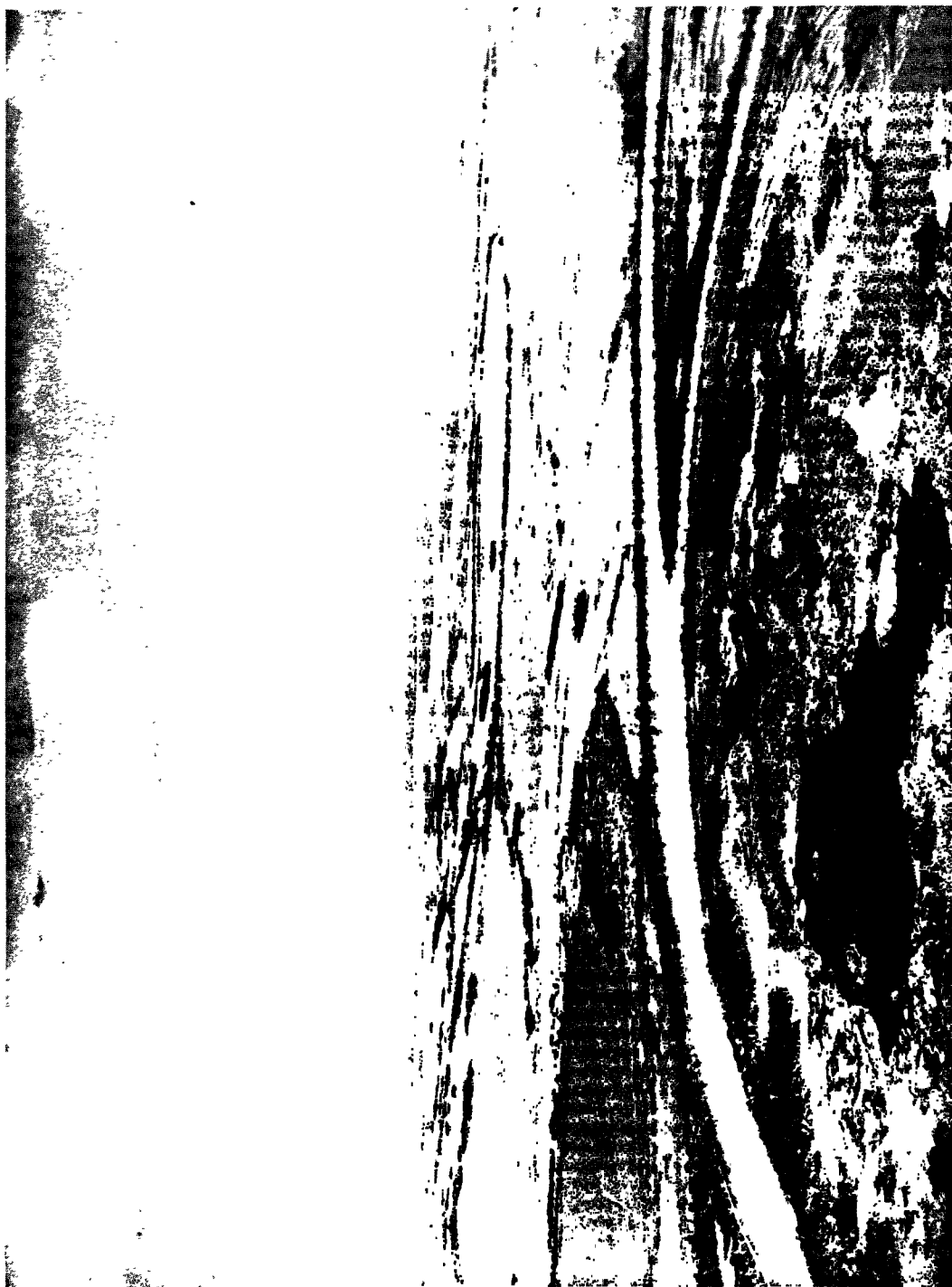


PLATE 26. The Usumacinta River Delta, Tabasco, Mexico.



Reichheld, Acad. Sci., Proc.

PLATE 27.—Large Ruins discovered at Latitude 17° 40' North; Longitude 89° 50' West, Northern Guiana.

far above the treetops, which here were at least a hundred feet high. At a conservative estimate, the top of the largest ruin must be one hundred and fifty feet above the level of the surrounding country and the other three mounds are possibly two thirds of that height. The size of the largest mound puts it in the class of the great temples of Tikal, the largest and one of the oldest of the Maya cities, which is not more than forty miles away from this site.

While circling around these ruins, which we later estimated to be at 89 degrees 50 minutes west longitude and 17 degrees 40 minutes north latitude, we saw another high mound with a smaller pyramid behind it, near the top of a different ridge about seven miles to the south. We flew over to these elevations, which were at about 89 degrees 50 minutes west longitude and 17 degrees 32 minutes north latitude. This second site consisted of a high pyramid, to the northeast of which was a lesser one, and to the south and east a group of low mounds. [Plate 28.] It was impossible to decide whether or not these low mounds were artificial. Masonry was visible, however, near the top of the large ruin in this second group, which likewise was photographed.

These two sites are both on the northwestern slopes of two ridges running nearly northeast and southwest. The approach to them from the west is over flat country gradually rising toward the ridges. No clearings, water holes, trails or openings in the vegetation were seen in any direction from either of these sites, and it would be very difficult to land anywhere near either of them in this country today. The rivers seen a little while before the first and largest group was reached are probably too narrow and the jungle covering them too thick for any plane to use for landing, although they might possibly be used by an autogiro equipped with pontoons. It may, also, be possible to approach within a few miles of these ruins by canoes coming up the Candelaria river.

After looking in vain for signs of other ruins, we left for Belize at about 12.25, and in a few minutes were over much more broken country, full of ridges and low hills like the region of northern Yucatan around Uxmal, and which appears to be a continuation of this same formation. At about 12.45 we were fairly well out of this broken country, which, including an area of low ridges on both sides, seems to be sixty to seventy miles wide in this region. A small river running north and south was visible at this time as well as a large clearing with clumps of trees and patches of sand showing plainly from the air. The vegetation soon became less dense and the country much flatter, meadows appeared far ahead and low hills to the northeast. From here on the plane rose to an altitude of 7000 feet in order to obtain a favorable wind and at 12.55 was above open patches of country. All along the horizon to south and east the clouds were massed at a level well below us,

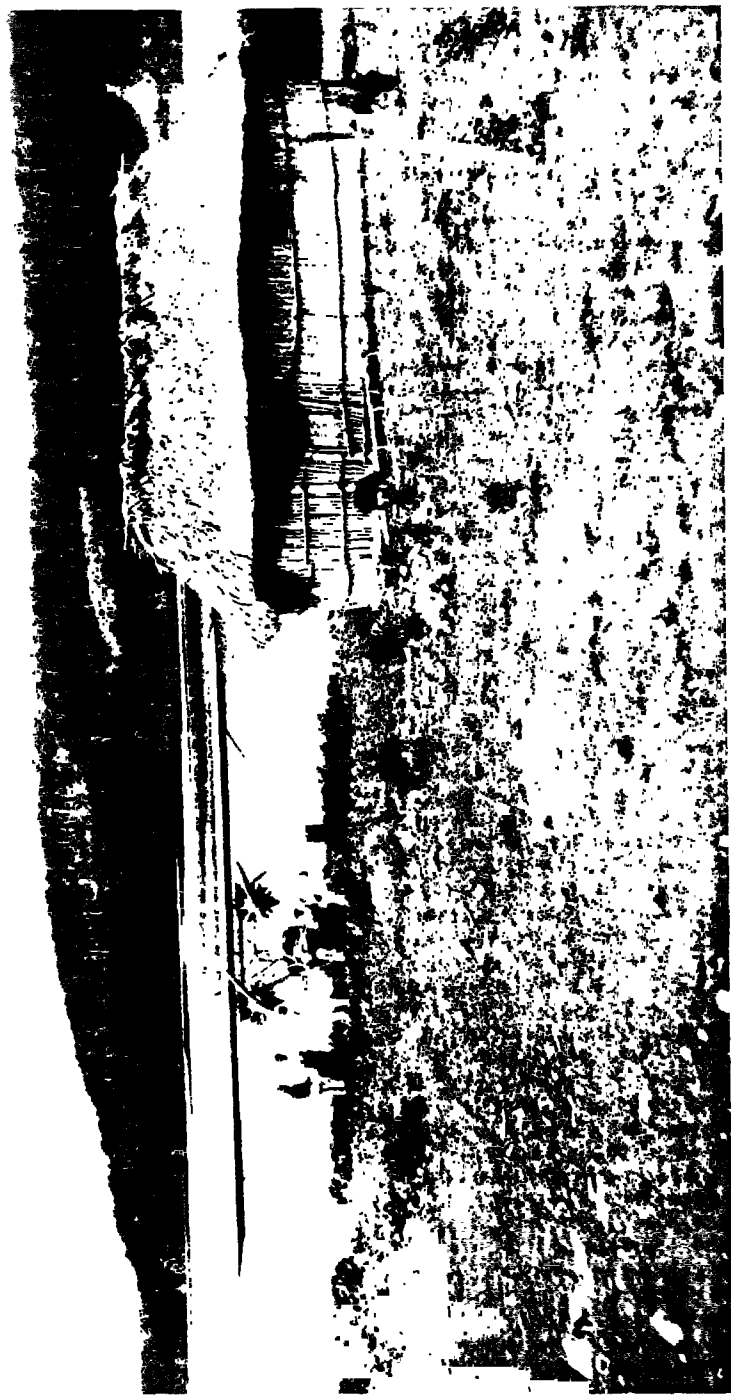
like an enormous snow field on the top of a mountain continuing as far as the eye could see.

At one o'clock the plane was over a large swampy area with a river in sight ahead of us. A wireless was sent from the plane to the *New York Times* reporting the discovery of the two new sites. At 1.05 we reached the junction of Laboring Creek and Old River, forming the Belize River. Mountains or high hills showed on the horizon far to the south. Five minutes later three large mounds were plainly visible, about fifteen miles to the northeast; probably the ruins marked New Boston on the Blom-Ricketson-Spinden maps. The country beneath and ahead was low and marshy with creeks and rivers winding in all directions. At 1.23 we were over the town of Belize, with its colored roofs and houses looking very picturesque from the air, and in two minutes more landed on the sea in front of the wooden ramp of the Pan-American Airways' station, after two hours and thirty-five minutes flying time from Carmen, over a distance of approximately two hundred and fifty land miles.

Mr. Masson, Belize Manager of the Pan American Airways Company, met us at the ramp with telegrams, letters and clippings from the American papers. Our baggage was given a perfunctory examination through the courtesy of the local officials, and we then went to the Palace Hotel where we found the accommodations were the best since leaving Havana, with the single exception of Merida. After lunch at about three o'clock, we decided not to take the plane out the next day, but to rest and work out our plans for the remainder of the trip while the motors were being overhauled. We had very little remaining flying time after making allowance for the amount necessary to return to Miami, so that it was impossible to take a trip south to Copan and Quirigua. These two well-known sites, however, apparently have no suitable places in which a plane could land and are reported to be not well cleared of vegetation. If so they would not show up from the air sufficiently distinctly for worthwhile aerial photographs.

After dinner that evening we called on Mr. P. W. Schufeldt, a prominent chicle contractor and one of the leading citizens of Belize, who has a vast amount of information about Maya ruins in British Honduras and North Guatemala. We spent several pleasant hours at his house and met the Port Quarantine officer, who very courteously expedited the quarantine regulations for all of us. Mr. Schufeldt also believed that southeastern Campeche and the extreme northern and northwestern parts of Guatemala were now the most likely places in which to find new and large Maya ruins. He suggested that the two ruins we had discovered that day might be two shown on the Blom-Ricketson-Spinden map in that vicinity, but added that as far as he knew, they had never been seen except perhaps by native chicle gatherers, by whom their mere existence had been reported and their map positions made





PICTURE 29. The Plane at Yaxha, North Central Guatemala.

by guess. Later on, after our return to the United States, Mr. Frans Blom, of Tulane University, confirmed these statements after examining his data on the above maps. These two sites are therefore new scientific discoveries, having been located, described and photographed for the first time.

On December 8th, after breakfast we wrote up our notes, and later on the writer, Mr. Gregory Mason and Dr. Alden Mason again visited Mr. Schufeldt. As the result of our conference with the latter, and a study of the maps we decided that the Yaxha Lakes were the only available place near ruins worth examining which might be reached within a reasonable time by using the plane. We found that Tzibanche, the site we had originally thought of visiting in Quintana Roo, probably could not be reached from Lake Bacalar, as it is separated from it by one or two deep "bajos" or swamps, which at this time of year would be full of water.

In addition to ruins on the Yaxha Lakes which have not hitherto been well investigated, Mr. Schufeldt told us of a site called El Gallo, about twelve miles inland from the lakes near a place called San Clemente, which he thought would well repay a visit. He very kindly pointed out certain difficulties in visiting this site at this particular time, however, saying that it was so soon after the end of the rainy season that the trails might be impassable on account of the mud, and that no men or animals might be available at the village on the Yaxha Lakes as the chicle was still coming out from that country. At the end of the discussion, we finally decided to go to Yaxha as these lakes were but an hour away by plane, and to be guided on arriving by the situation found on the ground. In the afternoon, the writer, Dr. Mason and Mr. Gregory Mason called on Sir John Burdon, the Governor of British Honduras. We were most cordially received and learned a great deal about the past history of this interesting colony, of which Belize, a city of about 12,500 people, mostly negroes, is the capital and seaport. Its principal industries are fishing, exporting hardwood and chicle, and last but by no means least, rum-running to the United States.

On December 9th we left Belize about 7.11 and headed for Yaxha, which is a little to the south and west. For the first ten minutes the plane passed over a swampy area followed by low ridges but by 7.22 we were above a mass of high steep-sided hills with white patches of mist streaming up from their peaks like veils of smoke. This range was about 1000 feet high and was everywhere completely covered with vegetation. It continued below for the next twenty-five miles and appeared to run from south-southwest to north-northeast. At about 7.45 the peaks were nearly 1500 feet high and the plane was flying in and out of masses of clouds only a few hundred feet above the summits. It was impossible to go much lower on account of the danger of running into a hillside and it seemed possible that we would not be able to find the lakes on account of the low lying clouds, as we could

only occasionally see the country below us. Five minutes later the plane crossed a branch of the Belize River, and in a few more minutes the clouds became thinner and the mountains lower. At eight o'clock the Yaxha Lakes were sighted dead ahead, consisting of two large bodies of water close together. Either one large or two other smaller lakes were visible farther off to the west. In a few minutes more the plane circled over the more westerly of the twin lakes, which are at an altitude of 600 feet above sea level, and then dove down to the water and skimmed across its surface to the shore at the native village of Yaxha. [Plate 29.] The Lindbergh-Carnegie Institution flight landed on this same lake in 1929, so some of the Indians had already seen an airplane at close range. The trip from Belize covering eighty-two land miles was made in fifty-four minutes in the air; a journey which takes five to six days by boat and mule.

The native village consisted of about twenty thatched huts on or near a neck of land between the two largest lakes and contained fifty or sixty inhabitants, mostly women and children, as well as several pigs and dogs, all of whom were at the water's edge to meet us. The pilot taxied the plane until it almost touched the land, and then threw a rope to a native. The latter came out along it hand over hand standing in a dugout canoe and our party then went ashore in the same way. After a good deal of difficulty and much discussion about the El Gallo ruins, we finally succeeded in hiring a very decrepit horse and two men to accompany us to that site. Later we obtained another man and a mule, which enabled us to have all our baggage transported on animals. Our schedule was written out and given to Captain Ormsbee, calling for his return to the lake in three more days at noon. The plane then taxied away while Gregory Mason took moving pictures of it, rose beautifully in the air, and finally disappeared in the center of a cloud about 1500 feet up and directly over our heads.

After the plane left, some time was spent in making final arrangements about food and baggage. The natives refused to be hurried in any way although both Gregory and Alden Mason used their best efforts to get us off. At last the animals started ahead by land and the expedition and its baggage were put in two dugouts for a short voyage of three or four miles along the lake to where the trail to El Gallo intersected with its shore, thus saving us that much walking and the animals an equal amount of effort in carrying our baggage. Each canoe was paddled by a single Indian, and both were so heavily laden and so unsteady that it was necessary to lie almost flat on the bottom in order to maintain any sort of balance. The Indian paddlers cheered us with the assurance that the lake was full of alligators which were very fond of men, but we accepted this rather startling information as the usual attempt of all local inhabitants to impress strangers with the difficulties and dangers of their country and their work.

About an hour after starting, we reached a little creek running up from the lake and intersecting with the trail from the Yaxha Lakes to the ruins. It was very hot. At a little before noon, the thermometer in the sun registered 106° F. When the animals arrived they were swum across the creek which at this point was about fifty yards wide, then repacked, and the start for the ruins was made at 12.20. From then on, at intervals of almost exactly one hour, we came upon a series of camps of the chicle gatherers or "chicleros." These camps are thatched lean-tos in clearings along the trail where the mule trains spend the night wherever it overtakes them on their long trips. They are usually placed as near as possible to a convenient water hole and, with this qualification, are a "league" apart. A chiclero's "league" is the distance which a loaded mule will travel in one hour, and may be two and a half, two and three quarters, or three miles. The distance that a mule will travel in a day is called a "jornada" and, varying with the nature of the trail, the country, the mule and the chiclero, is anywhere from ten to twenty miles. The language applied by the mule drivers to the animals sounded very familiar both in tone and in emphasis. A free translation given by one of our party conversant with the subject showed that the Indians of North Guatemala were applying to their mules the identical epithets used by American mule-skinners to the same kind of animals. Evidently the Guatemalan mule moves best only under the same sort of persuasion as is needed for the Missouri variety.

The trail we followed runs from Flores to British Honduras and is the principal highway in the Peten district of North Guatemala. It is in no sense a road, but a mule path cut through the jungle, very rough and in spots exceedingly muddy. In many places it was a series of alternating humps and hollows worn about a foot deep by the feet of many mules sliding down into what were at first only small depressions. The route ran through typical forest country. Great mahogany, cedar, ceiba, ramon and sapote trees towered from a hundred to a hundred and twenty-five feet in the air, interspersed with numerous cuhoon palms whose fronds were as much as thirty feet long, with each leaf or blade running eight to ten feet in length from the parent stem. The jungle on both sides of the trail was choked with vegetation and the air was hot and very moist. We finally reached the thatched chicle huts which were to be our base at five o'clock, a journey of twelve miles from the ford, or six hours in all from the Yaxha Lake settlement. We unpacked and made camp immediately upon arriving, as in that latitude it becomes dark by six o'clock and there is no twilight.

We prepared for the night by hanging our hammocks from the supports of the chicle huts, and surrounded them with mosquito netting, through which the ends of the hammocks were run, like an arm through a sleeve. In the writer's opinion, at least for a tall person, the hammock cannot properly

be regarded as a sleeping facility but merely consists of a more or less uncomfortable accommodation in which to spend the night off the ground. Our food that evening as well as during the rest of our stay in the forest consisted principally of canned soup with rice, Indian tortillas or corn cakes, beans, coffee, and a little preserved fruit.

The water in the near-by water hole was soon used up and we had to rely upon that found in the next nearest one, close to a large chicle camp about a mile away, in which the mules continually wallowed. Twice a day one of our men went there with the animals and canvas water bags. These water bags, however, carried so little water and the need of it for cooking and drinking was so great that none could be used for washing purposes. The water itself was very unpleasant, both in appearance and in smell. The natives had no idea of the meaning of the word "boil" in contrast with "cook," so we could not rely upon them to heat the water long enough to sterilize it properly. Consequently, it was treated with succinylchloramide tablets, which free chlorine when dissolved in water. Hot water saturated with chlorine was all we had for our canteens and in that climate it never became really cool.

On December 10th after a very early breakfast, we left a little after sunrise with our guides for the ruins which were perhaps half a mile from camp. The approach was by a woods trail made by chicle gatherers looking for ramon trees, whose leaves and nuts constitute the principal fodder for their mules, as no grass grows in the jungle. The bush here was very thick, with lofty trees, dense underbrush, and creepers and vines closing in from every side. The howler monkeys were still calling at this early hour and the uncanny maniac laugh of the *chachalaca* bird occasionally shattered the silence. Countless other lovely birds, and beautiful butterflies of every description filled the air.

The first ruin reached was a mound about 125 feet long and perhaps 20 feet high and 25 feet wide at the top, with no signs of masonry. We then climbed about 20 feet up the steep side of a ruined terrace fifty yards east of this mound and abruptly came to twin temples perhaps 50 feet apart, which towered high above a mass of débris at their feet. The sloping bases of these towers were each about 25 feet high and the masonry walls ran sheer up from the tops of these bases 35 feet or more into the air to the remains of ruined rooms at their summit. The western temple showed a cornice on which ornamented stone work was plainly visible. [Plate 30.] On the north side of each of the towers were the remains of what had once been very steep stairways running 65 feet up from a lower plaza to the temples on their tops.

About a hundred yards to the north of these twin temples, at the opposite side of a lower plaza we came upon the jungle-hidden ruins of an enormous



PLATE 30. Western Twin Temple, San Clemente Ruins, North Central Guatemala; note the cut stone cornice.

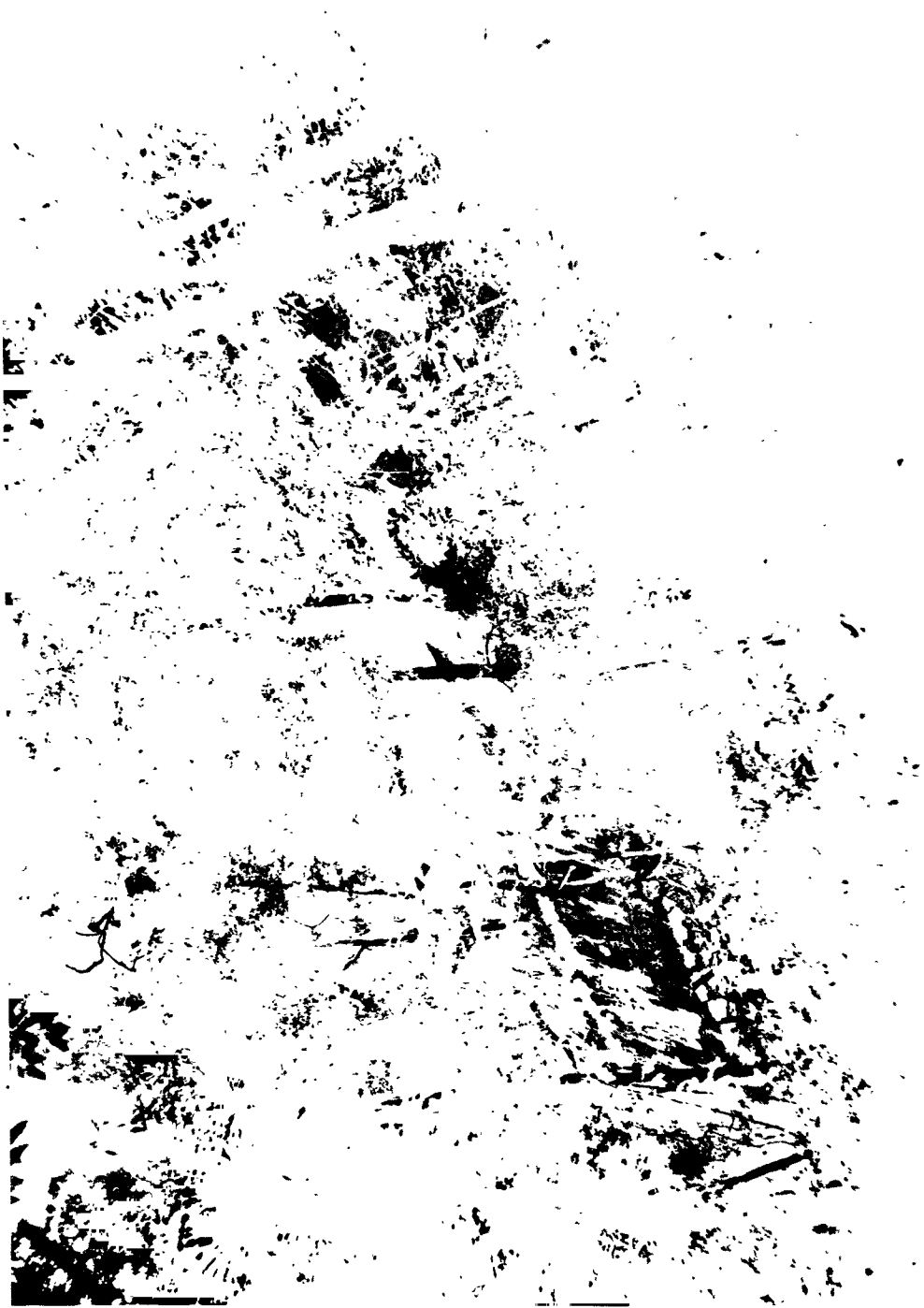


PLATE 31.—San Clemente Ruins; note the cornice on the long wall.

structure built around two levels in the form of a rectangle open at the eastern end. The south wing of this building was about 220 feet long, the west one nearly 100 feet in length and the north wing a little shorter. The west and north wings of the building showed 20 feet or more of clear masonry wall rising through the forest from masses of débris which sloped steeply 60 feet or more down to the general level of the surrounding country. [Plate 31.]

After a hurried inspection of these buildings, we studied the formation of the entire site, which could be divided into three distinct parts. (1) The rectangular building to the north, opening directly to the east, which included an upper and lower court connected by a ruined stairway 15 feet high and which may be called the northern plaza. (2) Fifteen feet below the level of the lower court of the north plaza, the main plaza ran due south to the base of the twin temples and contained two long mounds in the middle and three on the sides, also two stelae whose glyphs had been weathered away. (3) A third plaza extending south rose fifteen feet above the central plaza, the twin temples towering up through the trees at the intersection of the middle and southern plazas and facing squarely to the north. The site as a whole was clearly an acropolis on the summit of a natural hill which had been leveled off, and its long axis ran to the true north as accurately as if laid by compass. Their location and style of architecture identifies these ruins as characteristic of the First Empire, and in all probability they were built perhaps 1500 years ago. See plan of ruins, Plate 32.

This site is only a few miles away from Uaxactun, the oldest of the ancient Maya cities, and Tikal, the largest and one of the best preserved. Each of these has been visited and described by many archaeologists, and Uaxactun is now being cleared and excavated by Carnegie Institution under the direction of Mr. Oliver Ricketson, who has only recently uncovered by far the oldest known Maya structure.¹

The next morning, December 11th, we found three stelae in the central plaza which we had missed the day before, one leaning forward with a perfectly clear under surface which was probably covered with painted hieroglyphics when it was erected. Unfortunately, the glyphs had disappeared and the surface was only smooth stucco. Round stone altars were discovered at the bases of the stairways leading up to each of the high temples, and various mounds in the south and central plazas which had been at first overlooked. The rectangular building on the north plaza was examined very carefully and found to contain six rooms in fairly good condition, and the remains of several others. A passage ran through the south wall of the northern structure where the upper and lower courts met, and in this passage a number of carvings of human figures with head dresses and spears were

¹ An excellent description of these two extraordinarily interesting sites is found in *Maya Cities* by Dr. Thomas Gann, published by Duckworth, of London, England, in 1927.

still visible on the stucco-covered walls. In one of the rooms of this large palace the marks of a human hand painted in red were clear and fresh after fifteen centuries, and in another room a wooden lintel with the bark clinging to it lay where it had been placed by the builders in those far off days — a striking evidence of the hardness of sapote wood. A number of fallen stelae in the central plaza and the two round altars by the temples were turned over, but nowhere on them, or on any of the buildings, was anything resembling a glyph. To the east of the twin temples a small lower plaza with parallel mounds on its east and west sides, and two stone covered barrows, or graves, beyond the eastern mound were a surprising new discovery.

After an enormous amount of cutting, chopping and hacking with our machetes we cleared away enough vegetation to measure the dimensions of the various plazas and ruins, and take numerous photographs of the principal features. This completed all that a preliminary survey could show and we returned to camp about 4.30. Rough sketches were made of the general plan of the site including the mounds and the graves found to the east of the central plaza, and two “chultuns” or underground storage receptacles discovered near the long high mound first seen. One of these chultuns was scarcely visible but the other was in excellent condition. It consisted of a hole in the surface about 3 feet in diameter leading down to two intersecting round chambers each about 5 feet high and 10 feet across, separated by a masonry wall, completely dry and in good condition.

It may be of general interest here to give a few comments on the jungle of this region, which is at an altitude of about 800 feet above the sea. In the great tropical rain forest of this part of north Guatemala the principal fauna include jaguars, peccaries, tapirs, black howler monkeys and ring-tailed monkeys. Great quantities of birds are everywhere, particularly shortly after sunrise, and include the wild turkey, curassow — a large black bird with yellow crest — many kinds of parakeets, toucans, hawks, buzzards, herons, chachalacas, orioles and humming birds; and countless butterflies. No snakes were seen, although the Central American rattler or “Cascabel,” and the Fer-de-lance or “Bothrops” are supposed to be fairly common, and the boa constrictor is occasionally encountered.

The curse of the Central American forest is the insects. The only ones in the region which did not bite were the bees, which for some strange reason, are here without stings. Mosquitoes and flies were not particularly bothersome, but the red bugs and the small “garrapatas” or ticks which infested the vegetation were annoying beyond words. We were bitten incessantly by these pests, which are so small they are hard to see, and there is apparently no effective remedy or preventive. The bites itch and burn for several weeks in a hot climate. The natives seem to be much less troubled by all insects, possibly because they generally use neither sugar nor salt.

PLAN OF RUINS CALLED "EL GALLO," NEAR SAN CLEMENTE, PETEN, GUATEMALA

AFTER KARL SAPPER, 1897 AND F. BLOM, 1924
AS ALTERED BY UNIVERSITY OF PENNSYLVANIA MUSEUM, 1930
NOT ACCURATELY SCALED, DISTANCES AND HEIGHTS IN ROUND FIGURES

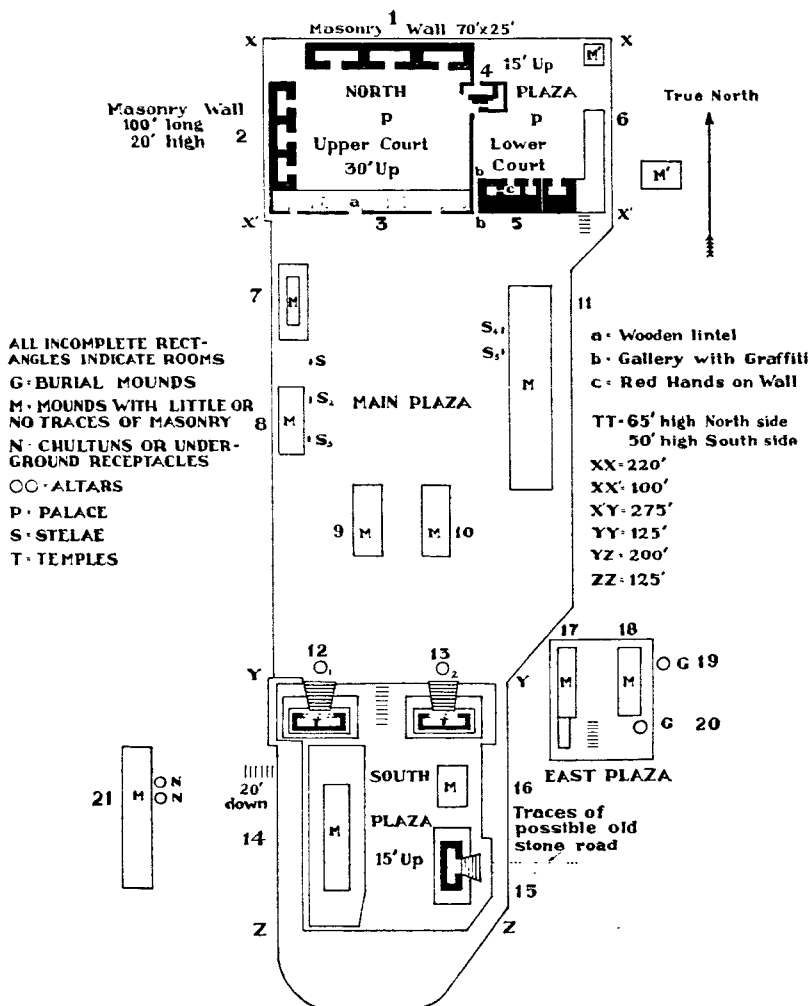


PLATE 32.—Sketch Plan of San Clemente Ruins.

In the middle of the day, even in December, the thermometer runs up above 100° F. in the sun. The temperature in the shade is usually around 80 degrees, but accompanied by great humidity, making the air like that of a hothouse. Due to the massed vegetation there is never the slightest trace of a breeze. Of the three nights spent in the jungle, two were uncomfortably cold, below 60 degrees, the other about 70 degrees. Contrary to the ordinary opinion, there is no danger from the heat, as the tropical forest is not much hotter than many August days in Philadelphia, and sunstroke is unknown in Central America. The real hazards of travel off the beaten track are thirst and hunger and disease, but within the zone of cleared passages, and with ample supplies and proper care as to diet, water, and so forth, the wilderness is probably no more dangerous than the streets of a big city.

Even in the middle of the day the light is always dim and mysterious. The giant trees tower up over a hundred feet toward the sky, carrying with them great clusters of vines and creepers, which shut out the sun. The vegetation is so dense that it is impossible to see any distance through the close knit green curtain. The whole setting is sombre and depressing, the great forest giving man a terrific sensation of loneliness and of his utter insignificance amid the vast forces of nature. The web of the treetops blankets the sky, so no stars shine to light the night in the forest and soon after the sun sets the darkness drops in a solid wall. Later on, the unbroken jungle can become beautiful beyond words under a full moon. Its shimmering rays pour through the great trees and the masses of vines and creepers etching in silver and shadow an effect which cannot be described to those who have not been fortunate enough to see it. In full daylight, the great rain forest is silent, with a menacing, crouching stillness, but with the darkness, sounds of every description come and go, near by and far off, from the soft steps of land animals to the curious deep wailing roars of the black howler monkeys. Sometimes all sounds sink down and down until the faint noises of the wilderness at last die away in even lower murmurs, slowly fading beyond human hearing into the farther side of silence.

It is hard indeed to put into words the strange feeling of wonder which comes at the first glimpse of great forest-covered buildings of a civilization that passed away long ago. Mixed with this wonder is a consuming curiosity to find as soon as possible all the hidden secrets of the ruins and a profound hope that just ahead waits some new and important discovery never made before. The imagination strains itself to visualize the splendor of these structures in the days of their glory and the lives of the people who built them. It is these and many other kindred sensations that make field archaeology today perhaps the most fascinating of the sciences.

After an early start from camp in the cool of the morning of December 11th, we reached the Yaxha Lakes about noon, and were met there promptly

by the plane. Captain Ormsbee, with his usual thoughtfulness, had brought us sandwiches and a large supply of beer on ice, which was most cordially appreciated as a wonderful change from hot chlorinated water. After quickly finishing the beer, we gave the ice to the natives who had never seen it before and who were quite at a loss to know what it was or what to do with it. After examining it carefully and passing it around, one of them tied up a piece in cloth for future preservation and departed to hide it for safe keeping. Two native boatmen were then persuaded to take a tow in their dugouts behind our plane while we photographed their trip. They were terrified by the thundering of the motors and the gale from the propellers, but held on to the free end of the rope throughout the ride, so they must have enjoyed it in their own strange way. The sight itself was full of interest — the primitive dugout canoes which have not changed for thousands of years hitched to perhaps the most finished product of the machine civilization of the North. A successful test was also made of the possibility of lowering supplies to a ground party by parachute from an airplane. The parachute was dropped from a height of about 500 feet and carried its load down so slowly that ordinary provisions or even moderately thick glass would not have been damaged at all.

After these performances were over, we paid off the men, gave them a lot of left-over food, shook hands all around in farewell, and left the Yaxha Lakes shortly after one o'clock. We flew toward the ruins on which we had spent two days hard work clearing away vegetation and which were not more than twelve miles away, but we could not find any trace of them from the air on account of the thickness of the forest. The plane then headed for Belize where it landed at 2.18. From the center of the north Guatemalan jungle with its ancient Maya ruins to the civilized city of Belize was an amazing transformation — like moving through a thousand years in fifty minutes.

Following a most welcome bath we again called on Mr. Schufeldt, and after some further investigations learned definitely what we had previously suspected. We found that the ruins we had visited were already known under the name of "San Clemente" and had been examined and charted by Messrs. Sapper, Morley and Blom, although none of them had made any detailed measurements or taken photographs of the buildings at the site. We did not observe any traces of a building reported by Sapper and Blom at the northeast corner of the north plaza, or of a large structure reported by him opposite its southeast corner. These are marked M¹ on the Plan of ruins, Plate 32. We crossed this area several times and can only suppose that these ruins have been completely obliterated by the forest. We also did not see two stelae reported by these scientists to be just south of stela 4 and 5 shown on the plan. On the other hand, we discovered a considerable number of

interesting features in these ruins which had previously been overlooked. Our measurements, photographs, and the newly discovered material undoubtedly constitute a contribution to archaeological knowledge and will no doubt be embodied later by Dr. Mason in a more formal monograph.

The next morning, December 13th, we left Belize at 7.05 heading about north-northwest. The weather was cloudy, as is usual in this latitude at that time in the morning during the winter season. At first the country below was a flat marshy plain, fairly well covered with vegetation. This is typical of most of the coastal region of British Honduras, which is so low and swampy as to appear unsuitable for human habitation. Ten minutes after leaving Belize, long low ridges appeared in the west about twenty-five miles away and running apparently almost due north. At half-past seven the country was full of hills and ridges with lakes and ponds scattered in all directions. The same long range of low hills still appeared on the western skyline. At 7.41 we crossed New River, which at this point is very winding, and three minutes later passed a good-sized "hacienda," or plantation, with six or eight huts around it. What appeared to be the southern end of the Bacalar lagoon was visible about six miles away to the north, as well as a very prominent landmark in the form of a high whaleback ridge perhaps twenty-five miles away, to the northwest.

At 7.47 the Bacalar Lagoon showed up to the right and ahead of us, and three minutes later the plane crossed the Rio Hondo, just above an Indian village at the edge of a very dense jungle. The Rio Hondo near this Indian village appeared to be deep enough and straight enough for a plane to land on, but it may not be sufficiently wide. In any event, a water landing could be made within a comparatively short distance of this village, which is evidently Sac Chan, from which Dr. Gann made his start for the ruins of Tzibanche, which he has described fully in a most interesting work.¹ [Ruin III, Map.] At 8 o'clock the plane was over a wide valley full of water between ridges running north and south. Here we circled around four suspicious looking mounds on the eastern side of a long low ridge but saw no masonry, and could not determine whether they were natural hillocks or artificial elevations. The country here was very broken and full of small hillocks. The high whaleback ridge already mentioned was only a few miles away to the north. This was obviously the ridge referred to in the Carnegie Institution's account of the flight with Lindbergh near which several new sites were found.² It runs approximately north-northeast and south-southwest, and is about five miles long, and eight hundred feet high.

At 8.12 we circled another high mound on a lower prolongation of the whaleback ridge running to the southwest. From its shape and general

¹ *Maya Cities*, by Thomas Gann, pages 64-92 (Duckworth, London, 1927).

² *Geographical Review*, April, 1930, page 198.

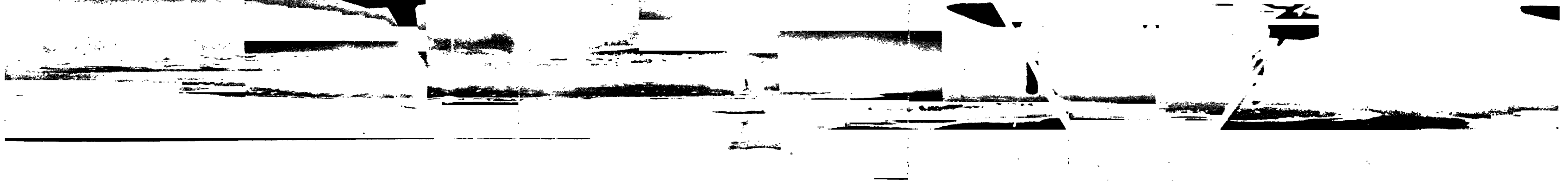


PLATE 33.—Mosaic Airplane Photograph of Bacalar Lagoon Region, looking slightly south of east. The Lagoon is the long, narrow body of water in the left half of the plate; the sea is visible in the extreme left background.

Fairchild Aerial Surveys, Inc.

appearance this mound was certainly artificial. Three other mounds were near by. We could see no masonry but believe that this mound was one of the temples of Tzibanche. According to the notes of the writer as well as those of the pilot, at about this time the plane was three miles southwest of the southern end of the ridge where a group of four distinct mounds were observed, one larger than the other three, which fits almost exactly with the description of Tzibanche from the air given by Messrs. Kidder and Ricketson of Carnegie Institution.¹ We did not, however, observe the aguada and clearing which they noted at this site, and may be mistaken in our identification. If so, these mounds we examined may be another new ruined city in this area.

Owing to some mistaken instructions the pilot then took the plane away from this position toward the western side of the whaleback ridge and afterwards returned to its eastern side by a different route and we did not again pick up the ruins of Tzibanche. At 8.18, however, we passed immediately above another group of three mounds which were almost certainly ruins, as their conical shapes were arranged accurately on the points of an equilateral triangle with a square cenote a little southwest of the base. [Ruin D, map.] These ruins are about three miles northeast of the northern end of the ridge and in a broken country. They are probably new, as they do not correspond with the description or the location of any of the other ruins found in the neighborhood of the whaleback ridge by the Carnegie Institution archaeologists, and they are not shown on any known archaeological maps.

Judging from the mounds which the expedition investigated, the new site that it found, the known ruins of Tzibanche, and the two others in the vicinity reported by the Carnegie observers, this region of the whaleback ridge is certainly a most promising field for future archaeological investigation. It is apparently very difficult to reach it from Lake Bacalar, as the country between the ridge and the lake contains one or more deep valleys in which water was seen through the trees, and which are probably impassable to ground parties during most of the year. The best way to approach the ridge seems to be by way of the Indian village of Sac Chan on the Rio Hondo and thence by trail, probably a two days' land trip, according to Dr. Gann's account above mentioned. If arranged for ahead, men, mules and guides can probably be obtained at Sac Chan, which is about a two days' voyage from Belize.

The center of whaleback ridge and the ruins of Tzibanche appear to be respectively ten and five miles north and about twenty miles west of the southern end of the Bacalar Lagoon.² The other ruins reported are all only

¹ *Geographical Review*, April, 1930, page 198.

² The position of this ridge and ruins is incorrectly shown on the accompanying map—Plate 1. The Bacalar Lagoon and other lakes extend farther south and lie more to the eastward than there shown; and the Blom-Ricketson-Spinden maps are also equally incorrect as to the same details of this area.

a few miles north of the site of Tzibanche and, although none were seen, it is quite likely that on or near the top part of the whaleback ridge some very large buildings will be found. It is known that the Maya were inclined wherever possible to build on the tops of hills overlooking the surrounding country and this large ridge is by far the highest point in this extensive region.

With considerable reluctance we finally left the region of the ridge and the rolling broken country around it and headed for the northern end of the Bacalar Lagoon, almost immediately crossing over a large, deep "bajo" (valley), the bottom of which looked full of water, and a few moments later, a lesser depression. At 8.25 the plane reached the western shore of a large crescent shaped lake directly west of the Bacalar Lagoon, which is here a very long thin body of water running roughly north and south and also shaped like a crescent, its points being so bent that they run almost east. Other large bodies of water lie immediately to the west and north, the one adjoining Lake Bacalar over whose shore line we flew being even more crescent shaped than the lake itself, with a high limestone cliff near the northern end of its western shore, which in places resembles a ruined structure. The distance between the Bacalar Lagoon and Chetumal Bay is much less than appears from the map and probably does not exceed ten or twelve miles. A large number of photographs were taken of this region which tied up the area around the Bacalar Lagoon with the new lake previously described, over which we had flown eight days before on the trip from Merida to Carmen, and which we could see off to the northwest. This country is now covered by a mosaic of airplane photographs from which when enlarged its principal features can be accurately plotted on future maps of the region. [Plate 33.]

The plane left the Bacalar Lagoon at 8.37 and in a short time came to a region of dried-up lakes, resembling the area in the southeastern part of Quintana Roo covered in the flight from Merida to Carmen. The visibility was poor on account of a general haze or mist, which extended in all directions. For the next twenty minutes the country was of the same character, dense jungles in spots, with here and there patches of open country which were once lakes, and about nine o'clock the plane passed a dried-up water course which covered an enormous area. From nine o'clock to 9.10 a northeast bearing led over a region of swamps and pools of water. This area would now be impossible to traverse on foot, and certainly could never have been lived in by any large number of people. At 9.20 the sea was reached at Espiritu Santo Bay and our northeast course slightly altered for Cozumel Island. The country between Espiritu Santo Bay and Ascension Bay for a long distance inland appeared to be of the same low swampy character. Between these two bays the land ran far out into the ocean, and the sea showed lovely shades of light blue and green against its white sandy shores.



PLATE 34. The Pan American Airways Company's Base at Cozumel Island

From here the course over the ocean continued to the wonderful blue lagoon bordering the opalescent sea at Cozumel Island [Plate 34] where we landed at 10.14, three hours and nine minutes from Belize. During this flight we saw not a single sign of human life from the village of Sac Chan on the Rio Hondo in British Honduras to the sea at Espiritu Santo Bay. The trip covered perhaps an hour and a half in time, or a hundred and fifty miles of flying with a lateral visibility of at least twenty miles, so that an area of 3000 square miles was examined which apparently contained no trace of man.

After refueling, the plane left at 11.02, rose to 12,500 feet to obtain the benefit of a westerly wind, and arrived at Havana at 1.46, or two hours and forty-five minutes from Cozumel Island. We enjoyed an excellent lunch at the flying field, left Havana at 2.45, and landed at the Miami airport at 4.50, just eight hours in the air from Belize. At 6 o'clock in the morning of the previous day we had broken our camp in the heart of the forest of north central Guatemala, and at six o'clock that night — 36 hours later — we were comfortably settled in the Columbus Hotel in Miami, Florida; a most extraordinary transition, possible only with a modern airplane as the magic carpet.

This completed the work of the expedition, which had flown a total of thirty-seven hours and eleven minutes. The pilot's compass bearings, observations, and notes of this entire trip are set forth in Appendix B hereto. Twenty-five hours of this flying time were spent over the Maya area and about 2500 miles of territory in Central America was covered. It is almost impossible to calculate how long it would take to duplicate this journey on land. As a rough and ready rule we found that the plane covered in an hour a distance which would require a week to traverse by mule or on foot. At a minimum estimate, therefore, we traveled in twenty-five hours a distance which could not be covered in less than six months on the ground, and as much of the area flown over was unbroken forest, it is possible that it could not be accomplished at all in any other way. A large part of the country observed by the expedition had never before been seen from the air and a considerable portion of it was hitherto completely unexplored and unknown to white men.

RESULTS

The Museum Expedition accumulated a great deal of valuable information, much of it in fields other than archaeology, and brought back over 200 airplane photographs and about 50 taken on land. The most important geographical information relates to the formation of the peninsula of Yucatan and the country immediately south of it, and may be of considerable importance in tracing the past history of the Maya people. For what follows, some allowance may be made for the fact that none of the expedition were prac-

ticed in aerial observation in this sort of country or had more than an elementary knowledge of geology. It must also be remembered that we saw this area just at the end of the rainy season. According to our notes, however, the physical geography of Yucatan is as hereafter set forth.

All the northern and northeastern part of Yucatan is an absolutely level limestone plain covered with dense vegetation. In the northwestern part, however, starting a little north of Uxmal, in the state of Yucatan, a range of hills runs southwest toward the port of Campeche and another spur southeast nearly to the boundary line dividing the state of Yucatan and Quintana Roo. Beyond this point in a southeasterly direction the country is flat and low as far as the vicinity of Lake Bacalar. The entire central area of the peninsula drains to the southeast.

A band of broken rolling country runs straight south from Uxmal between the 89th and 90th meridians of longitude. At its northern end this region is very wide, running east from the 90th meridian to beyond Peto, but narrows to about fifty miles at the intersection of the boundaries of Yucatan, Quintana Roo and Campeche. It continues in this narrow belt due south for about forty miles from this intersecting boundary point and then begins to widen out toward the east as far as the 89th meridian. The country becomes flatter farther south, but rises again near the border of Guatemala, and at that point this strip of rolling country is a wide zone of low hills and long ridges sixty to seventy miles across. West of this area, beyond the 90th meridian of longitude and south of the 19th meridian of latitude, Campeche is nearly all low and wet with many swamps, pools, creeks and rivers showing through the jungle. East of this zone, from the 89th meridian to $88^{\circ} 20'$, southern Quintana Roo is also a low flat area, containing the beds of many dried-up lakes and rivers in the region lying between Lake Bacalar and 19 degrees 30 minutes north latitude. Several good sized lakes not shown on any map were also seen in this territory.

The mountains which rise in southwest British Honduras continue nearly north along its western boundary, becoming low hills and ridges as they run into Quintana Roo just inland from Lake Bacalar. Perhaps twenty miles due west and ten miles north of the southern end of this large body of water, a whaleback ridge eight hundred feet high and five miles long, running south-southeast and north-northwest, stands out as a landmark visible from many miles away. North of this high ridge lesser ridges and isolated hills are found on a low flat plateau country running to the north-northeast in a narrow zone, perhaps thirty to thirty-five miles wide and occasionally broken by stretches of swampy country, through Santa Cruz Bravo to the sea near Tulum. East of this slight plateau, which may be an ancient shore line, Quintana Roo is low and soggy all the way to the sea; west of it is the region of dried-up water courses and scattered lakes already mentioned.

The formation of the Yucatan peninsula, as seen from above, strongly suggests that the entire area has risen considerably within comparatively recent times, possibly even within the past 1500 to 2000 years. All southwestern Campeche, and southeastern Quintana Roo east of the zone of low plateau country, already described, are today almost at sea level and are so swampy as to be practically uninhabitable. This in itself would not be of great significance, but perhaps becomes so when coupled with the existence of the great area of ancient dried-up water courses in the central territory between 88 degrees 20 minutes and 89 degrees west longitude and 18 degrees 50 minutes to 19 degrees 50 minutes north latitude. A slow elevation of the peninsula which would drain this central area southeastward toward the sea and raise the land all along the coast from below sea level seems a likely explanation of the ancient dried-up water courses inland and at the same time the negligible elevation of the country bordering the sea.¹ Whether or not the peninsula has recently risen, however, the physical aspect of the region explored seems to have a direct bearing on the possible migration routes of the Mayas into Yucatan and to be a valuable guide to the location of new sites.

Almost all of the important First Empire cities found in British Honduras are in the low hills in the western part of the country and not in the flat plains near the sea. This higher land continues northward all along the western boundary of this colony and then becomes the narrow level plateau set with hills and broken by lower areas already described running past the whaleback ridge behind the Bacalar Lagoon through Santa Cruz as far as Tulum and possibly Coba. It appears to offer by far the most satisfactory route for the migrations or settlements of the people who populated the east coast of Yucatan in times long passed away. Whether or not the eastern side of this low plateau was the shore of the sea in those far-off days and so perhaps was approached in canoes by the tribes migrating northward is a question on which only a geologist who could date the possible rising of the peninsula is competent to express an opinion.

It is of interest to note that Tzibanche and two other new sites found by the Carnegie Institution-Lindbergh flight of 1929 and one of the four new sites found by the University Museum Expedition are in this higher country immediately back of Bacalar. Moreover, if the thirty-five mile wide zone already mentioned be drawn with the western shore of Lake Bacalar as its eastern limit and this zone prolonged north-northeast to Tulum it will take in new ruins, II, III, IV, V, VII and VIII located by the Carnegie Institution-Lindbergh flight and Ruin D (see map) as well as Muyil, Tulum and

¹ In *Civilization and Climate*, Ellsworth Huntington argues strongly that the principal cause of the decline of the First Empire of the Mayas in the south was due to a climatic change. This would at least be accelerated by a rising of the area, which would also at the same time disturb its water courses and water supplies.

possibly Coba. Thus the probable zone of the settlements and northward migrations of the east coast Maya tribes a thousand years and more ago, which can be deduced from the geography of the region, is apparently substantiated by the recent discoveries of many important ruins almost entirely within the favorable area indicated by the formation of the land.

Arguing from the same analogy, the Mayas of the First Empire who came north into the country around Uxmal presumably made their way over long periods of time through the band of rolling country in the area just west of the 89th meridian previously described, as the eastern area of the peninsula and its southwest coast region were so low and wet as to be impassable to large bodies of people. This theory of another favorable settlement and migration route in the west central area of the peninsula between 90 and 89 degrees west longitude is borne out by the Blom-Ricketson-Spinden maps. These show many ruined sites throughout this region of rolling ridges, running roughly from Tikal in north Guatemala to Uxmal in western Yucatan; and the two new ruins (B and C) found by the University Museum in northern Guatemala are just inside the boundaries of this zone. How far these geographical theories will finally fit the archaeological facts cannot be determined until much more work has been done in the southern territory of Quintana Roo, northwestern Guatemala, and southeastern Campeche.

A number of other lesser items of geographical knowledge were also obtained, which have been generally covered in the preceding pages of this article and may be summarized briefly as follows:

(a) The expedition's maps showed a large lagoon at the northeastern end of the peninsula of Yucatan, covering many miles in area. This is now nearly grown over with vegetation except for one or two small water courses, and future maps and coast charts should be changed accordingly.

(b) In northeastern Yucatan a chain of three separate lakes was found running nearly northwest and southeast, with three smaller bodies of water around the largest one, which was over a mile long and about three-quarters of a mile wide. These lakes are incorrectly shown on the Blom-Ricketson-Spinden maps, as two lakes, and are marked Coba. They are not the lakes of Coba, but an entirely different group located at approximately 20 degrees 38 minutes north latitude and 87 degrees 42 minutes west longitude, almost due west from the town of San Miguel on Cozumel Island, about twenty-eight miles inland from the village of Carmen, and nearly ten miles north of the lakes and ruined city of Coba.

(c) The lakes at Coba, on and near which are situated the well-known Maya ruins of the city of the same name, are four in number, and run in an almost straight chain west-northwest and east-southeast. The two largest are at the western end of the chain and are respectively about 2500 and 2100 feet long, separated by a narrow tree-covered neck of land. These lakes

are at approximately 20 degrees, 30 minutes north latitude and 87 degrees 42 minutes west longitude. After allowing for wind drift, they seem to be directly west of a point about nine miles north of the extreme southern tip of Cozumel Island and approximately 25 miles inland from the sea.

(d) According to calculations made from the plane by dead reckoning, the Indian village of Yaxuna, shown on the maps carried by the expedition as nearly due south of Chichen Itza, is eight to ten miles west of its map position. The Coba-Yaxuna causeway is, of course, correspondingly lengthened to about seventy-three miles.

(e) All maps of the peninsula of Yucatan show a large lake near its center called Chichancanab. The University Museum Expedition was unsuccessful in finding this lake anywhere near its location on any maps which it carried. The country about twenty miles due east of the intersection of the boundary lines of the states of Yucatan, Campeche and Quintana Roo, in which this lake is usually shown, contains no body of water of anywhere approximating the size of Chichancanab. It is believed that this lake may be a much smaller body of water seen perhaps fifteen miles east of its map position, and about ten miles southwest of the town of Saban, or else, and more probably, it is twelve or fifteen miles north of its present map location and nearly south of the town of Peto.

(f) In central Quintana Roo, the expedition discovered at least three new lakes more than one mile long in a region about twenty-five miles northwest of Santa Cruz Chico at the northern end of Lake Bacalar. None of these bodies of water is the lake known as Lake Payegua, found by the Carnegie Institution-Lindbergh flight of 1929 while searching for Lake Chichancanab, and none are shown on any of the expedition's maps.

(g) Most maps of Campeche show a tramway running almost east from a short distance up the river at whose mouth the town of Champoton is located. This, we were advised, was incorrect. According to Messrs. Moore and Shumaker of Carmen, Campeche, this tramway runs south-southeast, instead of almost east, to Juarez, a place about twenty-five miles north-northwest of the lake and village of Silbituk. This lake and village are about sixty miles east of the eastern end of the Laguna de Terminos instead of approximately fifty-two miles, as shown on maps carried by the expedition. This added distance from Silbituk to the sea is doubtless correct because the Laguna de Terminos is not much more than forty-five miles across in an east and west direction from a point just north of the mouth of the Mamantel and Candelaria rivers to the town of Carmen, instead of somewhat over fifty miles as shown on the expedition's maps. As the island of Carmen is probably correctly located, the north and south shore line of the Laguna de Terminos should be extended at least five or six miles to the west. The north and south dimensions of this large lagoon were not accurately checked.

(h) The bay in the Laguna de Terminos into which the Candelaria and Mamantel rivers empty is almost due east from the port of Carmen.

(i) In the state of Chiapas along the upper reaches of the Usumacinta River, Lake Anaite and Lake Petha were found about where they were placed on the Blom-Ricketson-Spinden maps. About eight to ten miles northwest of Lake Petha, in a blank space on all maps of Chiapas carried by the expedition, another lake in the mountains was discovered as large, if not larger, than Lake Petha. This hitherto unknown lake, christened Laguna Margarita, is located at approximately 17 degrees 9 minutes north latitude and 91 degrees 46 minutes west longitude. Several other smaller lakes were found in the same region.

(j) Lake Bacalar and the bodies of water adjacent to it are not shown accurately as to size or shape on any maps carried by the expedition. Lake Bacalar is much longer, narrower and more crescent shaped and extends farther south than drawn on any charts, the lakes to the west and northwest are much larger, and the distance between Lake Bacalar and Chetumal Bay does not seem to be more than ten or twelve miles instead of nearly twenty miles as given on most maps. The photographic map of this area [Plate 33] shows clearly the proper location of the various bodies of water within it and their approximate size, as well as the width of the land between Lake Bacalar and Chetumal Bay. It should, however, be noted that these lakes were probably unusually full at the time of our trip at the end of the rainy season. A full size mosaic photograph of this area has been put together and should be of great value to future map makers of this little known area of Yucatan. It would, of course, be even more useful if the photographs were enlarged. A scale of this photographic chart can be made when desired.

In addition to the above geographical data the expedition secured a great deal of information about the population of certain zones which may be of some importance.

(a) The great territory of Quintana Roo, with the exception of Payo Obispo and Bacalar, a few little villages along the sea, and the towns of Santa Cruz de Bravo and Saban, is practically uninhabited. It seems doubtful if the total population of this immense area, outside of Cozumel Island, exceeds 5000 people and the true number is probably considerably less.

(b) The east central part of the peninsula of Yucatan, in an area lying approximately between 19 degrees 20 minutes and 20 degrees north latitude and 88 degrees 20 minutes to 89 degrees 20 minutes west longitude, with the exception of the village of Saban, appears to be completely uninhabited. The expedition could see in its flight perhaps 3500 square miles of this country, and the most careful observation failed to show a single hut, clearing, field, or any other sign of human life. It was also covered twice by the Lindbergh-Carnegie Institution flights of 1929, whose report on this general area is sub-

stantially the same. This part of Yucatan includes the low area full of dried-up water courses which has already been frequently referred to.

(c) That portion of the state of Campeche lying south and west of 90 degrees west longitude and 19 degrees north latitude seems also uninhabited, with the exception of a small settlement at Lake Silbituk and a few scattered huts along the Mamantel and Candelaria rivers. The Museum Expedition covered the northern part of this region in its flight southwest to Carmen, and the southern part in its journey from Carmen to Belize. It is doubtful if this territory, covering 4000 square miles has in all 1000 inhabitants. A large part of it is so low and full of swamps as to be nearly uninhabitable, although here again we saw it at the end of the rainy season and much of it may be dry enough during a large part of the year to be suitable for cattle raising and agriculture.

(d) The Museum flight went over the valley of the Usumacinta River from its gorge, near Tenosique, southwest to Yaxchilan, thence to Lake Petha, and thence northwest to the vicinity of Palenque. On this flight an area of at least 3000 square miles was plainly visible, and, with the exception of three Indian huts on Lake Petha, no signs of human habitation were seen. The country itself is so wild, broken and jagged, with dense tropical jungles everywhere, that it appears to be almost uninhabitable except along the shores of rivers, streams or lakes.

(e) Northern Guatemala from the air seems completely uninhabited. No clearings, huts, nor any evidences of man were visible. In all probability this region is only occupied by the chicle gatherers for a few months in each year, and it is possible that it is without any permanent human habitations.

(f) Quintana Roo, southeast of a line from the northern end of Lake Bacalar through Santa Cruz Bravo to Tulum on the sea is, for the most part an area of swamps and is probably uninhabitable except along the coast. The northeastern part of the same province, while not clearly swampy, is so low lying and wet that it is not now suitable for human habitation except on its shore line.

Besides the above geographical and ethnological data the following points as to the usefulness of an airplane in work of this kind seem worth stating as a matter of interest to those who are considering further exploration of the same general sort.

(a) A twin motor Sikorsky amphibian, well looked after and competently handled by a splendid organization such as the Pan-American Airways, is a safe and wonderfully efficient aid to the exploration of unknown country, particularly when covered with tropical vegetation.

(b) From the plane, geographical features such as hills, lakes and water courses can be seen, mapped and photographed in a way that is impossible by any other means.

(c) Such a plane can land on and take off from comparatively narrow rivers with currents up to ten miles an hour, and from lakes more than six feet deep and a mile or more in length, regardless of the height of surrounding vegetation.

(d) The size and power of the Sikorsky amphibian plane used by the Museum expedition added to its safety, but these same advantages made it dangerous to land on bodies of water surrounded by trees and less than a mile in length, such as the lakes at Coba. There are, however, several types of planes capable of landing on half a mile or less of water over five feet deep if carrying a fairly light load, regardless of surrounding vegetation. It is, however, extremely dangerous to attempt to fly long distances over the jungles of this region in a single engined plane, on account of the difficulty of getting out of the wilderness in the event of a forced landing.

(e) The Museum Expedition demonstrated the practicability of dropping materials by parachute to ground parties. The experiment made at the Yaxha Lakes showed that supplies can be landed by this means so gently that they will not be damaged.

(f) For purely archaeological exploration the fast flying heavy airplane is of little value in very broken hilly country covered with dense vegetation. The expedition flew within a hundred feet of the well-known site of Yaxchilan on the upper Usumacinta River and none of our party could see any traces of these ruins. In addition, we spent some minutes in trying to locate from the air the ruins of San Clemente, where we had spent two full days thinning out the vegetation, but were completely unsuccessful.

(g) It is exceedingly difficult to pick out from an airplane archaeological sites of Maya ruins covered with vegetation except in flat country or where the ruins are on or near the top of a ridge. In the latter two cases the sites can be located by flying so low that they stand out as elevations on the skyline. If the country is broken, this is, of course, impossible. Even in flat country all the available sites cannot be found, as it is not safe to fly low enough to see them except for very short stretches of time. Cenotes, which show up well from the air, are sometimes a valuable clue in Yucatan, as most cities in that area are near such natural wells.

(h) In this kind of observation, color is more important than shape. In other words, a white piece of masonry is much easier to pick out at a distance from the air than the whole jungle-covered mound of which it is only a part.

(i) It is the personal opinion of the writer that the vegetation on the ruins in the gray green jungle of northern Yucatan seems somewhat darker in color than that of the surrounding area; and that just the reverse applies to ruins in the rain forest area farther south, the vegetation on ruins in that region being apparently somewhat lighter in color than the adjacent zone.

(j) The responsible head of an expedition and the pilot of the plane should be connected by head-phones so as to permit speedy and accurate instructions as to change of direction on sighting a desired objective.

(k) Field or marine glasses are of little or no value in observation work from a fast flying plane, principally on account of the incessant motion.

The archaeological results of the trip, while not remarkable in the number of new sites discovered, seem important in some other respects. Under the portion of this report dealing with the geography of the area, reference has already been made as to the probable migration routes by which the Maya peoples came from the south into the peninsula of Yucatan along the rolling country in eastern Campeche and by way of the broken plateau running from just west of the Bacalar Lagoon to Tulum. The importance of this geographical hypothesis lies in defining the area in which archaeological work should be undertaken. It is evident that the most likely portions of the Maya area for work in the next few years on the east coast is in the zone running up northwestern British Honduras through the country immediately behind the Bacalar Lagoon and thence in a line up to Tulum or Coba,¹ and especially the region around the whaleback ridge west of the Bacalar Lagoon. In the western half of the peninsula, the most promising field is probably in the higher rolling country running from the ancient city of Tikal to Uxmal, and particularly in the parts of this zone lying in southeastern Campeche and northern Guatemala between 89° 30' and 90° west longitude.

On the other hand, vast stretches of land in southwestern Campeche, the area to the east of a line from the north end of the Bacalar Lagoon to Espiritu Santo Bay, the extreme northeastern part of Yucatan, and a zone covering the entire delta of the Usumacinta River from the hills of Palenque to the sea, are all so low and swampy that they are but sparsely inhabited today and in all likelihood could never have supported a large enough number of people to construct important cities in the past. Moreover, almost in the center of the peninsula of Yucatan is an extensive zone running from 19 degrees 20 minutes north latitude and 88 degrees 20 minutes west longitude, to 20 degrees north latitude and 89 degrees 20 minutes east longitude containing many lakes and many more dried-up water courses. This area appears in the not distant past to have been too swampy to have supported any great population, and, therefore, may also be tentatively eliminated from further archaeological research until the other much more promising areas have been thoroughly examined. Again, the country from the gorge of the Usumacinta River near Tenosique south to Yaxchilan and for many miles on both sides of the valley of that great river is so wild, broken and covered with almost impenetrable jungle that no ruins can probably be found

¹ The discoveries made by the Lindbergh-Carnegie flight as shown on the map are sufficient evidence of the importance of this area.

from an airplane and it is doubtful on account of its precipitous character whether it could ever have supported a great number of people. The hills and slopes are so steep that if the vegetation were cleared off, the surface soil would probably be rapidly removed by the rains. The whole nature of this terrain makes it unlikely that large enough numbers of people to have constructed important cities could have found sufficient means of sustenance in such a country, with the possible exception of the valleys of a few rivers and their tributaries.

The above areas cover a vast stretch of territory, and it is safe to say that as a negative result the expedition has perhaps succeeded in excluding from further archaeological work, at least for many years to come, a region covering more than 40,000 square miles. Conversely, on the positive side, the selection, for reasons given, of the broad stretch of broken country in southeastern Campeche and northern Guatemala, and the narrow band of low plateau country in western British Honduras and eastern Quintana Roo as the most likely sites for additional work appear to narrow the desirable zones for future exploration to a comparatively small area, not exceeding perhaps 10,000 square miles in the western region, and 5000 square miles in the eastern part of the peninsula. These conclusions based on geographical observations seem to be the most important results which have been accomplished from an archaeological point of view and by themselves might have justified the expedition. In addition, however, the following points are of considerable archaeological value:

(a) The expedition definitely located the position of Coba, the oldest Maya city in northern Yucatan. This site and the lakes upon which it is situated, were photographed from the air for the first time.

(b) The expedition traced and photographed for some distance a number of ancient causeways built perhaps 1500 years ago, and running in several directions from this city of Coba. Unfortunately their termini could not be located.

(c) A group of mounds near Valladolid in Quintana Roo, so symmetrically placed they are possibly the site of a new ruined city, was discovered and photographed from the air. [Ruin A.]

(d) Excellent aerial photographs were taken of several temples on the east coast of Yucatan and of the large sites of Tulum, Chichen Itza, Uxmal, Kabah and Labna, these being probably the best known cities of the Maya Empire in Yucatan.

(e) In northern Guatemala the expedition found and photographed two new sites of ruined cities, one of them very large and with an immensely tall temple. [Ruins B and C.] These important ruins have never before been located, described, or photographed by white men.

(f) A recently discovered important site in Quintana Roo called Tzibanche was reached by a route different from that covered by the Carnegie

Institution-Lindbergh flight or by Dr. Thomas Gann, who discovered it by land. A few miles from Tzibanche the expedition located a new set of ruins with at least three temples and a "cenote," not hitherto reported or shown on any map. [Ruin D.]

(g) While several new lakes were seen and closely examined, no ruins were found near their shores, a further substantiation of the well-known fact that the Maya in general were averse to building near such bodies of water.

(h) The expedition went by airplane from Belize to Lake Yaxha in northern Guatemala, and thence on foot to ruins about twelve miles inland called by some San Clemente and by others El Gallo. From information then available it was believed that these ruins had only been partially examined by archaeologists. A careful study was made of this site, several new features were found, accurate measurements were taken of its dimensions and the height of its buildings, and a number of excellent photographs of its various structures were obtained. It now appears that this site has already been described, although perhaps not in the same detail as that contained in this article or in that which may be given by Dr. Mason in a later monograph. No photographs have previously been taken at this site and these, with the measurements made of the buildings and plazas, and the discovery of a good deal of new material made the land trip well worth while from a scientific point of view.

SOME SUGGESTIONS AND CONCLUSIONS

The members of the expedition are unanimous in their belief that with the coming of the autogiro plane, a vast field of usefulness is now opened for this means of transportation as an aid to archaeological work. The airplane can cover in one hour a stretch of country which takes a week to traverse by mule or on foot and the perfected autogiro can hover over, land on, and take off from an exceedingly small area of water or of cleared and leveled hard ground.

The scientific bodies doing archaeological work in the Maya region in the future, when these planes have been commercially perfected and made available, can function much more efficiently if they will join in the purchase of a common plane of this type and in engaging the services of a pilot, the plane to be kept at Belize in British Honduras. This is the center of a wheel whose spokes run all over the Maya area, to Copan in Honduras, Piedras Negras on the Usumacinta River, the Peten country in northern Guatemala, and the Bacalar region in Quintana Roo, all of them districts of leading archaeological importance.

If the site to be explored is not on an available body of water, the ground expedition should immediately clear a space of only three or four acres at its permanent camp, level it off and give it a firm foundation. The expedition could then transport by autogiro a gasoline motor with which, if necessary,

a well to supply water could be driven, and electricity generated with which to operate a sending radio. Once this was accomplished, all further communication with the expedition could be by radio, by which all future supplies needed could be ordered when desired and brought from Belize by the plane. By this method an enormous saving in time and money could be effected in transporting men and provisions, and the resultant quick communication with the outside world and freedom from worry about the results of illness or accident — a serious matter to men a week or more away from medical aid — would undoubtedly increase the efficiency and add materially to the happiness of the personnel of the expedition. At the proper time the writer will be glad to coöperate in working up a committee to consider and plan out this phase of the work.

While the Museum's Expedition was successful in locating several unknown sites from the air, and with further practice in observation of this kind could probably have picked out several more, it is doubtful if such discoveries by themselves are worth the cost of making them.

Invaluable as the airplane is for general exploration and transportation, it is the writer's opinion that new ruins located by air in a district covered with dense vegetation such as the Maya country are of little scientific value until some means can be devised by which they can be found again by parties on the ground. In the dense forests of Yucatan and Guatemala, the Carnegie Institution-Lindbergh flight of 1929, and the recent expedition of the University Museum located from the air in all about a dozen sites, which were not known before. Granting the abstract scientific interest of these discoveries, it is hard to see how, standing alone, they have any tangible value. The map position of each of these sites can, of course, be plotted, in terms of degrees and minutes of latitude and longitude; but in the course of its flight the wind drift and other factors affect the speed of a plane so that the unavoidable error in the exact location of any site by compass course and dead reckoning cannot be less than a mile or two in both latitude and longitude, and is probably considerably more. Unless the trails of chicle gatherers run near these ruins they will have to be found again by cutting through miles of jungle to reach them; and when these trails do run near such sites, the chicle gatherers will find and report them in a very short time.

The vegetation in the great rain forest in this part of the world is so dense that a ground party in virgin jungle could cut its way past a structure the size of a modern football stadium and fail to see it at a distance of two or three hundred yards. Consequently, the unavoidable error of a mile or more, north or south, and an equal error east and west in plotting the ground position of ruins located only from the air may make it almost impossible to find them again by land unless a very large and expensive party is sent in to cut numerous trails in every direction until the site is discovered.

It may be feasible after relocating these new sites from the air, which would not be difficult, to drop a series of bombs or other containers full of mustard or other destructive gas over a large area of the jungle in lines in the form of a square or triangle with the site in the middle, so that the land party by picking up the trail of destroyed vegetation would be given an indication of the position of the ruined city. The destructive gas would have to be so handled that it acted on the underbrush and not on the tops of the immense trees, as the destruction of the upper foliage, especially in the southern area, would probably not be visible from the ground far below.

Another and possibly better method would be to lower from an autogiro or drop by a parachute on one of the ruins, a strongly constructed machine which would send out electrical waves for a considerable period to be picked up with appropriate instruments by the land party. Electrical devices exist by which the exact source of a distant current of electricity can be accurately located and if suitable apparatus of this sort were carried, the electrical machine at the site of the ruins would guide the land party to it. Of course, a complete aerial survey of the entire area resulting in overlapping mosaic photographs would be of immense value in determining the exact location of these sites, as a number of definitely known points could then be used as bases for compass bearings and the position of such new ruins much more accurately plotted than is now possible. This, however, is a very costly undertaking and cannot be expected for some time to come.

These are all interesting speculations which may or may not be practicable. Nevertheless until some sure method can be worked out to guide a land party through virgin jungle to the site of ruins located only from above, finding more new sites of ruined cities by airplane in the vast tropical forests of the Maya country appears to be of very little real scientific value and perhaps can more properly be classified as a fascinating although somewhat expensive sport.

APPENDIX A

LIST OF EQUIPMENT FOR FOUR PERSONS TAKEN ON UNIVERSITY MUSEUM AERIAL EXPEDITION TO CENTRAL AMERICA

Food bags (2)	Ponchos (4)
Cooking outfit	Chocolate (4)
Pocket compass (4)	Food
Flashlight (4)	Medicine
Spare batteries	Snake pencils
Bulbs	Rope (100 feet)
Machetes (4)	Large mosquitero (1)
Binoculars (3)	Small mosquiteros (4)
Blom-Ricketson-Spinden maps	Map paper
Succinylchloramide tablets	Brush
Pocket knives (4)	Orange sticks
Blankets (4)	Copy paper
Cross section maps and map case	Carbon
Map board	Ink
Musettes (4)	Matches (4)
Pencils	Canned alcohol
Fountain pen	Hammocks (4)
Pocket thermometer	Altimeter
Bottle whiskey	Canteens (4)
Matches	Water bag, one gallon
String	Fishline and hooks
Clinical thermometer	Hunting knife
Watches	Cigarettes
Fish flies	Aerial camera (1)
Snake bite serum (4)	Graflex camera (1)
Shot gun (16)	Moving picture camera (1)
Buckshot (25)	Rolls aerial film (5)
No. 2 (25)	Rolls graflex film (60)
No. 5 (25)	Moving picture film (1000 feet)
Climbing irons	Extra clothing
Game getter and ammunition	Toilet articles

APPENDIX B

PILOT'S NOTES ON FLIGHT

December 3, 1930: *San Julien, Cuba, to Cozumel via New Lakes.*

	Bearing, degrees	Depart- ure	Arrival	Travel- ing Time	Nautical Miles	Speed, knots	Observa- tions
San Julien.....	256	9:35 A	Zigzagging territory.
Cape Catoche.....	...	11:03 A	11:08 A	1:33	165	104	
Solferino.....	188	11:31 A	11:31 A	:23	29	75	
Lakes.....	79	11:57 A	11:57 A	:26	42	97	
Coast.....	100	12:21 P	12:21 P	:24	34	85	
Cozumel.....	...	....	12:30 P	:09	13	85

Course plotted from Lake Coba to Cozumel

Lake Coba.....	95	4:06 P	....	..	..	..
2 miles north of South Point light, west coast, Cozumel Island.....	..	4:35 P	4:35 P	:29	42	85	
Cozumel.....	..	....	4:48 P	:13	18	85	

December 4, 1930: *Cozumel to Coba and return.*

We took off at 10.54 A. M., following a bearing of 230 degrees to the coast. Because of the territory we were flying over and that the mission of the flight required occasional low flying, we flew on one engine from Cozumel over, to determine what altitude could be maintained with a 3,200-pound load. We held 250 feet without difficulty. We flew down the coast, circling ruins and zigzagging inland in search of indications of other ruins. At Blossom Point we headed west and examined Muyil and the lakes and territory adjacent to it. No additional mounds or ruins were observed. We then examined the territory between Muyil and Coba. At Coba we flew east and then west over the Lakes. The wind was ten miles per hour from the east and as near as we could calculate with a small wrist watch our travel over the largest lake averaged 17 seconds. We estimated our speed at 85 knots and judged the lake to be about 2,500 feet long.

	Bearing, degrees	Depart- ure	Arrival	Travel- ing Time	Nautical Miles	Speed, knots
Coba.....	90	1:16 P	....	...	...	...
Coast.....	1:36 P	:20	25	75
Cozumel, 9 miles north of South Point.....	1:46 P	:10	16	85
PAA Base.....	35	1:54 P

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December 4, 1930: *Cozumel to Merida.*

Cozumel	Bearing, degrees	Departure	Arrival	Traveling Time	Nautical Miles	Speed, knots	Observations
Cozumel.....	260	3:15 P	....	:34	50	90	Note: Observed causeways. Mound to N.W. near farm: no masonry apparent.
Coba.....	270	3:51 P	3:49 P	:12	18	90	
	330	4:03 P	4:03 P	:08	13	90	
	235	4:13 P	4:11 P	:10	15	90	
Yaxuna.....	250	4:28 P	4:23 P	:17	26	90	Taking pictures.
Chichen Itza.	35	4:45 P	4:40 P	:06	10	90	Taking pictures.
Merida.....	280	....	5:28 P	:43	64	90	Turned to right of course to observe Motul.
				2:13	196		

Faint shadow line bearing east and west on foliage observed on leaving Coba.

Scale of nautical miles taken from latitude 20 equals 196 nautical miles (224 land miles).

December 5, 1930: *Merida to Carmen.*

	Bearing, degrees	Arrival, Departure	Traveling Time	Nautical Miles	Speed, knots	Observations
Merida.....	193	1:56 P	:22	33	90	:01 Hilly country.
Uxmal.....	132	2:18 P	...	...	...
	...	2:19 P	:06	8	80	
		2:25 P	...	...	...
Kabah.....	132	2:28 P	:09.7	13	80	:03 Many ruins along course. Speed decrease due to frequent changes in course and light north wind.
Labna.....	91	2:38 P	:03	4	80	:01 Course changes indicate zig-zagging, for observations and photography.
	132	2:41 P	:03	4	80	
	91	2:44 P	....	..	80	
	...	2:45 P	:02.2	3	80	
	...	2:47 P	....	..	80	:01
	132	2:48 P	:06	8	80	
	185	2:54 P	:02.2	3	80	
	123	2:56 P	:17	22	80	Lake Chichancanab not apparent. Cloud shadows affecting ground observation.
	123	3:13 P	:09	12	80	Large swamp area like dried up lake.
	140	3:22 P	:03	4	80	
						Lake observed ahead.
	135	3:25 P	:06.7	9	80	
	110	3:31.7 P	:08.2	11	80	
Unknown	...	3:39.9 P	....	..	...	:02
Lake.....	186	3:41 P	:08.2	11	80	Over lake.
	231	3:49.2 P	:28	37	80	Climbing 5000.
	250	4:17.2 P	:35	50	85	
Lake Silbituk	266	4:52.2 P	:06	9	90	Lake not seen. Crossed marshy area. Nosing over slightly.
	266	4:58 P	:15	25	100	Sighted lakes on course ahead.
	...	5:08 P	....	..	103	Sighted lagoon and gulf.
	266	5:13 P	:13.5	23	103	Passing lakes.
	266	5:27 P	:13	22	103	Over lagoon.
	245	5:40 P	:14	25	103	
Carmen.....	...	5:54 P	....	..	...
Landed.....	...	5:56 P	....	..	...

Total distance, 336 nautical miles (386 land miles); time, 3 hours 58 minutes; average speed, 85 nautical miles per hour.

Distances taken from longitude 86°, latitude 18° to 19°.

AN AERIAL EXPEDITION TO CENTRAL AMERICA

December 6, 1930: *Carmen to Upper Usumacinta River and return.*

	Bearing, degrees	Arrival, Depart- ure	Travel- ing Time	Nautical Miles	Speed, knots	Observations
Carmen.....	149	9:02 A	:39	56	90	
	277	9:41 A	...	..	..
	138	....	:04	..	..	Observing river.
Santa Ana.....	169	9:45 A	...	..	..	Landed.
	...	11:53 A	:07	9	80	
	190	....	:06	8	80	
Tenosique.....	...	12:06 P	...	..	..	Landed.
	169	1:55 P	:10	13	80	
General Bearing	125	2:05 P	:15	18	...	Following river.
General Bearing	125	2:10 P	:15	20	80	Following river.
	288	2:25 P	:05	8	..	Changed course by request.
	114	2:30 P	:12	16	80	Following river to Yaxchilan.
Yaxchilan.....	279	2:42 P	:32	41	78	Bends in river recognized as Yaxchilan by party.
	323	3:14 P	...	..	..
Lake Petha.....	350	3:16 P	:04	..	..	:02 Zigzagging.
	...	3:19 P	...	..	..
New Lake, Lag- una Margarita	323	3:22 P	...	28	85	:03 Second group of lakes.
Near Palenque..	360	4:05 P	...	8	..	Looking for ruins in vicinity.
General.....	90	....	...	..	..	Palenque.
S. W. Monte Cristo.....	240	....	...	..	..	Returning to Carmen.
West of Palenque	360	4:10 P	:25	37	90	
	10	4:35 P	:15	23	92	
Carmen.....	...	4:50 P	...	..	..

December 7, 1930: *Carmen to Belize.*

	Bearing, degrees	Departure	Arrival	Traveling Time	Nautical Miles	Speed, knots
Carmen.....	120	10:50 A	11:18 A	:28	43	90
	130	11:18 A	11:19 A	:02	2	90
	126	11:19 A	11:26 A	:07	12	95
	107	11:26 A	11:31 A	:05	8	95
	94	11:31 A	11:58 A	:27	42	90
	122	11:58 A	12:09 P	:11	18	95
	138	12:09 P	12:13 P	:04	6	90
	90	12:16 P	12:18 P	:02	3	90
	160	12:18 P	12:21 P	:03	4	90
	70	12:24 P	12:53 P	:29	43	90
	94	12:53 P	1:18 P	:26	39	90
Belize.....	100	1:18 P	1:26 P	:08	12	90

December 7, 1930: *Carmen to Belize.*

10:50 A. M. Leave Carmen.

11:21 A. M. Marsh to left small river with rapid stream west.

11:22 A. M. Lake one mile.

11:30 A. M. Land wooded few hills and large swamp, hills about 500 feet above sea level.
River running north dried southeast.

11:31 A. M. Huts on river running E. x N.E.

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- 11:32 A. M. Lake 2 miles long running E. & W. 4 miles to south of course.
- 11:35 A. M. Small lake leaving swampy area.
- 11:36 A. M. Passing river that runs north and south that turns east 1 mile south of us.
- 11:41 A. M. Sighted pyramids.
- 11:44 A. M. Over small river that runs E. & W. and terminates in small marsh area.
- 11:47 A. M. Over lake one mile long runs N. & S., 2 islands in it.
- 11:56 A. M. Sighted mound.
- 12:02 P. M. Small river.
- 12:05 P. M. Small river.
- 12:11 P. M. 4 pyramids.
- 12:33 P. M. Over mountain area since last observation, has shown no cleared places, lakes or rivers.
- 12:40 P. M. Leaving low mountainous area.
- 12:43 P. M. Small river. N. & S.
- 1:00 P. M. Over large swamps.
- 1:04 P. M. Small lake $\frac{3}{4}$ mile long—round lake also.
- 1:06 P. M. Over river.
- 1:26 P. M. Arrive Belize.

December 9, 1930: *Belize to Yaxha.*

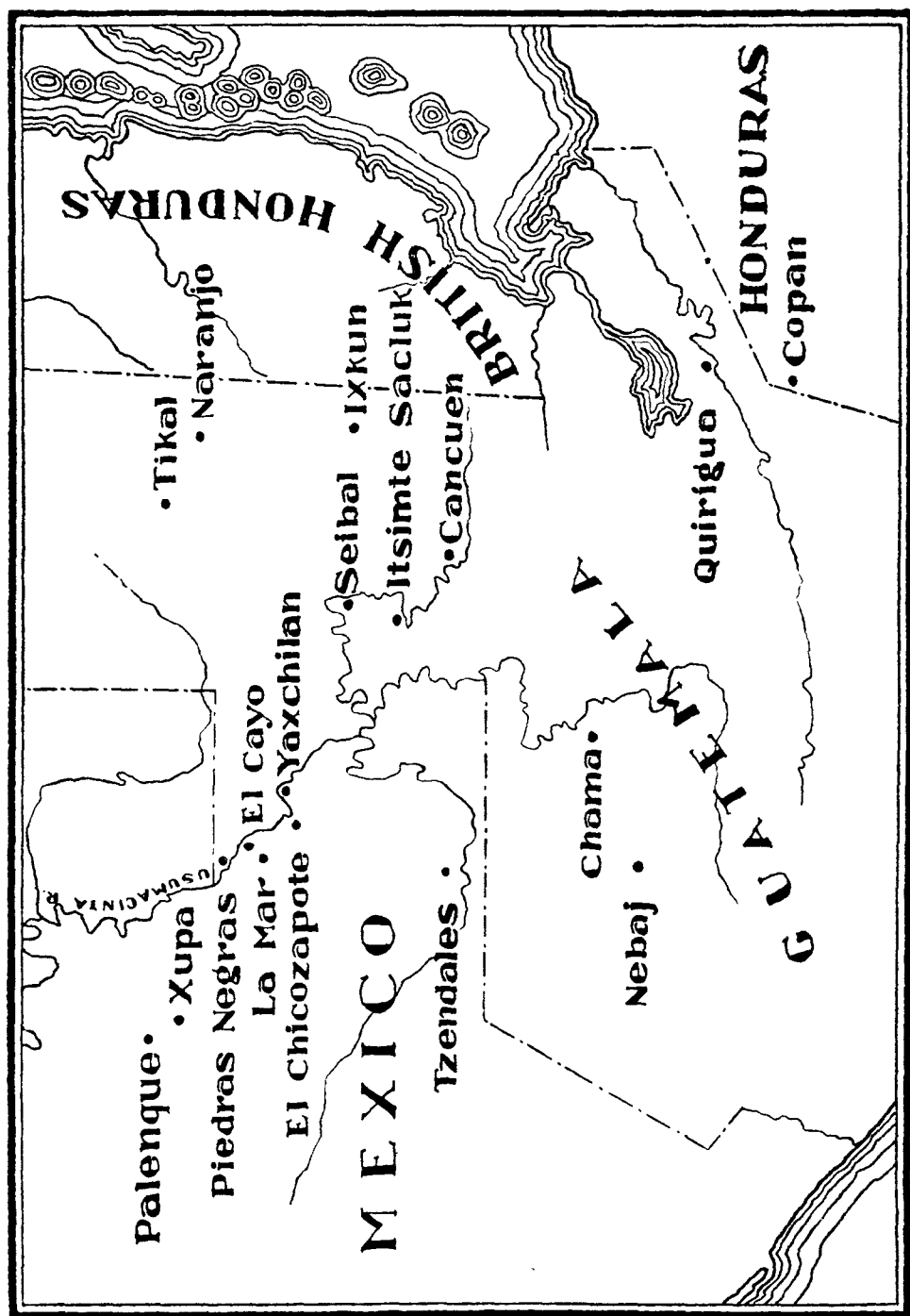
- 7:11 A. M. Left Belize on compass course of 245 degrees with a N.-N.E. wind of about 8 M.P.H. increasing slightly inland.
- 7:16 A. M. Passed northern lagoon on our left.
- 7:22 A. M. Over low scattered mountain range that runs generally N. E. to S. W.
- 7:25 A. M. Circling to observe weather.
- 7:28 A. M. Over river fork running S. W.
- 7:30 A. M. Over flat wooded land.
- 7:32 A. M. Over mountains.
- 7:43 A. M. Over stream.
- 7:53 A. M. Over river rapids. Sky 8/10 overcast, two cloud strata, one above us at 3,500 and one below at 2,800 feet; visibility hazy; altitude 3,200.
Town three miles to right. 10/10 overcast 3,400 feet, stormy ahead and 6/10 overcast at 3,000 feet clearer to N. W. and north. Over river flowing south-west.
- 7:59 A. M. Sighted lakes 5 miles to right. Bearing 312 degrees.
- 8:04 A. M. Over lake.
- 8:05 A. M. Circled lake and landed. Rate of speed to sighting lake 101 knots. Distance 82 land miles.
Return flight to Belize made to 9,000 feet without incidental observation. On a later trip the mountains were observed not to exceed 1,500 feet on course from Belize to Yaxha. The mountains well to south extend up above 3,000. Altitude of lake 600 feet.

December 13, 1930: *Belize to Cozumel.*

- 7:05 A. M. Left Belize for Cozumel via ruins on N.-N.W. course. Tzibanche reported west of lagoon Bacalar. With a light northwest-north wind.
- 7:15 A. M. Left Bayshore. A number of lakes inland about 20 miles bearing west from us. The country along the shore is low and marshy with many bayous and is thickly wooded inland.
- 7:20 A. M. Observed many small wet areas inland.
- 7:23 A. M. River and town.

AN AERIAL EXPEDITION TO CENTRAL AMERICA

- 7:27 A. M. Wet, heavily wooded flat land.
- 7:31 A. M. Lake 4 miles west of course with 2 islands in it. Suitable for landings. There are a group of lakes in this vicinity.
- 7:33 A. M. There is a large bayou extending inland about 4 miles, generally bearing southwest from Rocky Point in Chetumal Bay, U. S. Navy Chart V250 and covering the area where Sarteneja is marked on the Blom-Ricketson chart.
- 7:38 A. M. Passing village on lake with 8 islands on it. Good landing.
- 7:44 A. M. Passing farm with 2 large barns.
- 7:45 A. M. Passing well cultivated land. About 5 miles south of southern end of Bacalar tip.
- 7:50 A. M. Village on river, running E. and W. Lake with island 4 miles to right. Entering hilly country.
- 7:55 A. M. Turned to bearing 270 degrees and a point 3 miles S. of Whaleback Ridge, which is aptly described and easily recognized. It stands well above the surrounding hills at an altitude of 800 ft. Lagoon Bacalar was observed to be farther east from our course than the Blom-Ricketson charts would indicate.
- 7:58 A. M. Over trail running N. and S.
- 8:01 A. M. Circling large mound, which looks as though it might be of artificial construction. No ruins visible, so continued on course of 270 degrees.
- 8:02 A. M. At 8:02 we headed due south from a point about 3 miles due south from the southern edge of Whaleback Ridge.
- 8:05 A. M. At 8:05 we circled 4 mound formations. They were thickly covered with trees but looked as though they might be of artificial construction. No masonry was evident. There was some question as to the exact locality of the ruins with reference to Whaleback Ridge. Reported south of southern edge of ridge. So we took a bearing due north and slightly to the right of a parallel from the southern tip of the ridge. This country is quite hilly and distinction between natural and artificial construction hard to make. As we neared the ridge Mr. Madeira indicated 4 mound formations to our left about 3 miles bearing southwest from the southern tip of the ridge. We flew over and circled them closely without noticing any artificial construction. They also were very thickly wooded. We then examined the eastern and western side of the ridge without noticing any ruins.
- 8:15 A. M. At 8:15 we left the ridge bearing N.E. and noticed a group of 3 mounds about 3 miles bearing N.E. from the N.E. tip of the ridge. The ridge itself lies generally from N.E. to S.W. We continued on a bearing generally N.E. with occasional variations to observe mounds along the coast.
- 8:25 A. M. At 8:25 we were passing the western tip of a large crescent-shaped lake. The country was much flatter.
- 8:26 A. M. We turned to the right and reached the lake at 8:26.
- 8:30 A. M. We followed the lake and at 8:30 observed a very suspicious looking portion of the western shore where either masonry or the bank rose vertically from the water high enough to make it conspicuous. We circled twice for observation and photography.
- 8:37 A. M. At 8:37 the northern tip of Chetumal Bay was observed to be on our star-board beam. From there to Espiritu Santo Bay the land is very flat and thickly wooded and appears wet. There are a few water holes and small swamp areas. To our west a fog bank of about 200 ft. altitude had gradually reached about an 8/10 overcast condition. We followed the shore of Espiritu Bay to Bird Point and from there to Cozumel. Over water the wind was slightly increased from the north.



BUTLER: Dress and Decoration of the Maya Old Empire.

DRESS AND DECORATION OF THE MAYA OLD EMPIRE

A Study of Stone Carvings with some Comparison of Corresponding Features on Pottery and Jades

BY MARY BUTLER

I

ALTHOUGH the monuments of the Maya Old Empire — monolithic stelae and altars, stone and wooden lintels—are few in number and often badly worn, they are the fullest record we have of the dress of the people who raised them, for we have too little data on the provenance of most carved jade plaques, painted pottery, and terra cotta figurines to use them as primary evidence. The monuments show us the elements of costume found everywhere so combined in different cities as to give each site a distinct individuality. The irreducible minimum of Maya garb was headdress, neck ornament and girdle or loin cloth [Figure 1]. These, in one form or other, are universal; additional capes, skirts, sandals, leg and arm bands appear sporadically.

HEADRESS. The early Maya seem, like their later brothers, to have worn their hair long. Monuments from every southern site show figures, who, lacking more formal headdress, have their hair pulled up to the crown of the head, bound by ribbons or strips of cloth, and then allowed to hang or float at will, an inexpensive substitute for the feathers used on all forms of headgear [Figure 2]. Sometimes beads were strung separately or in groups along these locks of hair, sometimes feathers or flowers were mingled in the culminating tuft or in the binding, sometimes snake skin was used for binding or a bandeau. Some of the headdresses at Palenque and Yaxchilan are elaborations of this treatment, while others show the hair tied at the back of the neck. Almost every figure, however, on reliefs, jades or pottery, boasts a more or less elaborate example of one of the two main forms of headgear — turbans and mask headdresses.

Textile turbans take three forms: the horizontally folded, the vertically folded, and the round. The first, found at Copan, is in the shape of a truncated, inverted cone [Figure 3, a]. On its base, the top of the turban, may stand another truncated zone, a bird, a crocodile, or formal loops and

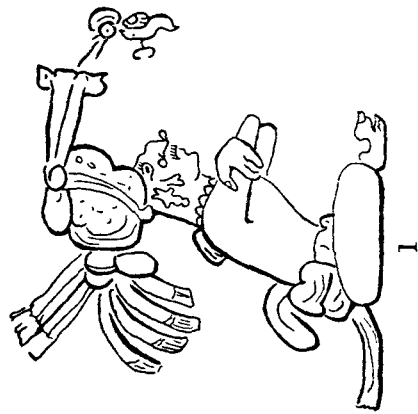
knots. It is also used on stela B as foundation for a mask headdress, and on stela I has only a very thick base to top it off.

The second form is found at Piedras Negras, sometimes with a snake mask on the front, or as a base [Figure 3, b]. The turban on stela 14 is decked with a death's head, and that on stela 1 with planetary symbols bounded by frets.

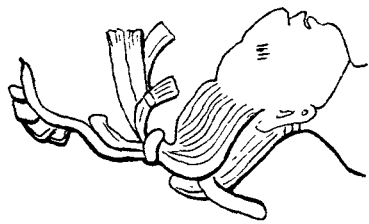
The round turban occurs at Tikal, Copan, Piedras Negras and on the Chamá pottery [Figure 3, c]. At Copan, it is hidden under a flame-like scroll, or appears as a neat hemisphere trimmed with three bows at the sides, and small grotesque heads at the back and front. Stela 35 at Piedras Negras may show a round turban as the chief element in the headdress; on stela 9 such a turban serves as foundation for planetary signs and base for an owl's head; on lintel 4, it bulges, unadorned, above a possible owl's head, and, large and balloon-like, is the only one that resembles the turbans on the pottery in its apparent roughly woven surface. The latter are trimmed by an occasional textile knot, a flower with feeding bird, or a flower and fish.

Various forms of cap are also found: a definitely pointed textile one at Yaxchilan [Figure 4, a], and tall cylindrical ones at Piedras Negras. That on stela 12 is topped by what may be an embryo turban, that on lintel 2 by an entire macaw. The helmets of the row of soldiers on this lintel are probably quilted caps [Figure 4, b]. At El Chicozapote, a tall cylinder tufted with feathers rests on top of the head [Figure 4, c], and the priest on the Palenque sanctuary tablets has a wide band wrapped or tied about his head into the same shape, while the worshipper wears a cap with four flaps falling from the top [Figure 4, d].

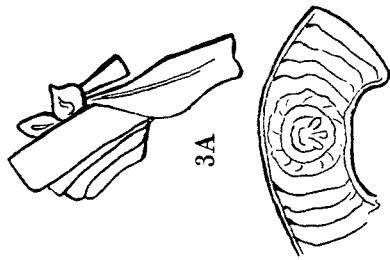
Mask headdresses probably derive from those which show the wearer's face framed in the jaws of a snake, thus imitating the deities, who, on monuments and codices, project whole or in sections from the mouths of serpents or mythical monsters [Figure 5, a]. An apparent sequence in this type of headdress can be traced in the dated monuments that show it. A lintel from Temple III at Tikal, dated A. D. 228 according to the Spinden-Morley correlation, used in this paper, shows the wearer's face between complete upper and lower jaws [Figure 5, b]. On stelae P, 2 and I at Copan, dated A. D. 363, 388, 407 respectively, and the undated stelae 1 and 2 at Tikal and the figure on the west side of the doorway in the Temple of the Cross at Palenque, the lower jaw has become a chin strap with a grotesque mask in the centre [Figure 5, c]; the latest of those dated, however, is the most realistic. At Piedras Negras, stelae 26, 31 and 7, dated A. D. 368, 378, 405, respectively, show another line of development of the lower jaw highly conventionalized [Figure 5, d], of which the beardlike appendage on the faces on stelae B and F at Copan, dated A. D. 471 and 523, may be a degeneration [Figure 5, e]. A chain hanging to the breast, at Tikal, and two chains



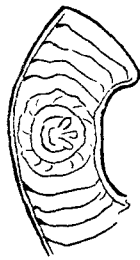
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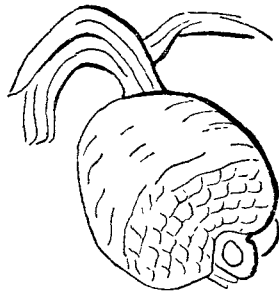
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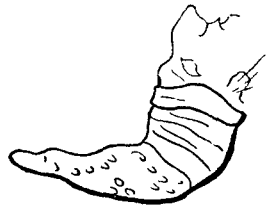
3A



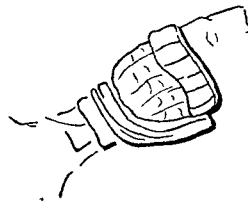
3B



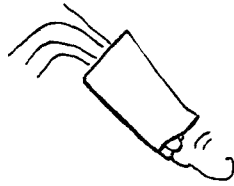
3C



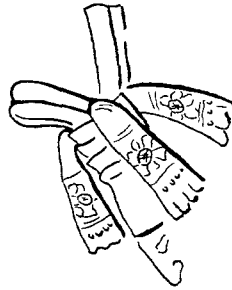
4A



4B



4C



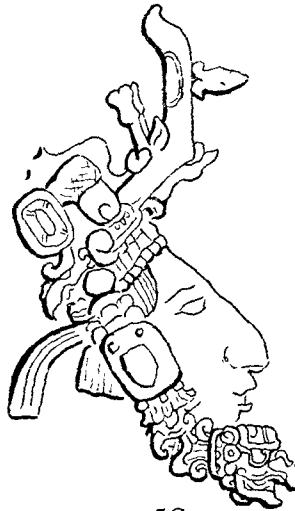
4D



5A



5B



5C



5D



5E

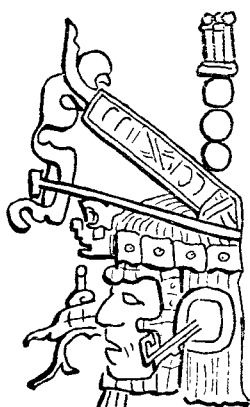
terminating in serpents' heads at Copan and Quirigua may be survivals of this idea, though this last ornament is found as a chain hung over the tree on a Palenque tablet. Headdresses, showing the front view of the upper jaw of a reptile snout, but lacking the lower jaw, appear at Copan and Piedras Negras, and on jade plaques [Figure 5, d]; such a snake snout is shown on a shield at Cankuen. These may be the same headdress that is shown in profile at Naranjo, Copan, Yaxchilan, Quirigua, Palenque, Tikal and Ixkun: various masks, lacking the lower jaw, of God K or his serpent proto-type [Figure 5, c]. Animal masks, as well, sometimes crocodile, sometimes jaguar, are often the main element in a headdress, and even a death's head is occasionally used. A variation is the headgear in which, over hair or head covering, is fastened, at the angle of a visor, a band decorated in front with a grotesque or reptilian head [Figure 6, a].

There are, of course, headdresses that do not fall into these two main classifications, such as a broad-brimmed hat, seen at Tikal, that is much the shape of the straw ones worn by the Indians of the Northwest coast, and is decorated with the crossed bones found at Piedras Negras, Chichen Itza, and on the cloak of the Bat God on a Guatemala vase [Figure 6, b]. A headdress of a crown of feathers surmounted by a large bird's head is worn by God D at Palenque, and by God N on a vase in the University Museum. Then there are headdresses at Copan, Piedras Negras and Yaxchilan that are difficult to classify except as braided or woven structures; several of these at Yaxchilan are characterized by stretches of striped or folded textile that may be derived from the turban [Figure 6, c]. Here, also, and at Cankuen and Piedras Negras, the serpent's tail, curled, is used as a base for construction [Figure 27].

For almost all these headdresses have a great deal of additional ornament; none, for instance, is without features at top, sides or back; some, in fact, are composed of little else. The snake, or some portion of his anatomy is the most prevalent decorative element: used entire at Copan, Piedras Negras and Seibal; half emerged from the top of the headgear at Yaxchilan, Naranjo and Palenque; one or more tails at Piedras Negras, Yaxchilan and Cankuen; an upper jaw at Copan; and a miniature sort of Ceremonial Bar at Piedras Negras. Additional heads or masks, human, grotesque, animal or reptile, are found in some form or size on headdresses at every site except Naranjo. Three superimposed round beads beneath an inverted bell-shaped one [Figure 6, a], usually serving as base for a burst of feathers, appear on top of headdresses at Tikal, Quirigua, Piedras Negras, Yaxchilan, Naranjo and Seibal. At Yaxchilan long neckbeads and an abbreviated openwork spear are sewn vertically at the sides [Figure 6, c]. A stela at Piedras Negras and a lintel from Tikal have textile rosettes in front and a sort of hinged elbow projecting from the rear [Figure 7]. Signs and symbols are fairly frequent;

probable planetary ones at Copan, Tikal, Quirigua, Yaxchilan, Piedras Negras, Palenque; a hand, palm out, at Copan, Piedras Negras, Seibal, Palenque; a fish feeding from a flower at Copan, Ixkun, Palenque, on pottery from Chajcar and Nebaj, and in borders at Palenque and the Chichen Itza ball court; a flower at Yaxchilan and Palenque; a fish at Piedras Negras; a bird feeding from a flower on a Chamá vase; a heron with a fish in its bill at Palenque and Seibal; a bird at Piedras Negras, Seibal and Copan. What Spinden refers to as a cruller-shaped symbol probably belonging to the sun god [Figure 8, a] is found over the nose of figures at Tikal, Seibal, Naranjo; on the head on the girdle of a Copan stela; and on that of shields carried at Tikal, Ixkun, Naranjo, Itsimte Sacluk and on the Gann jade plaque; and what he calls the symbol of the back, underworld head of the Two-Headed Dragon [Figure 8, b] occurs at Copan, Piedras Negras, Yaxchilan, Palenque; at the last-named site on an object held, as well as on a headdress. A fret curling up from the nose of a figure, in two instances at Yaxchilan [Figure 8, c], is exactly like that on the Gann plaque, proving that the latter is not a degenerate Toltec speech scroll but a purely Mayan symbol.

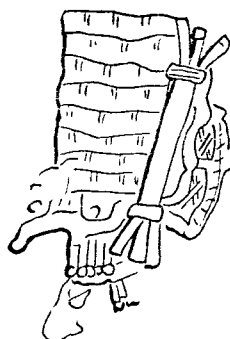
NECKLACES. These were practically universal, long and short, usually of round beads, but sometimes, as at Copan, of round and cylindrical beads combined. These beads were probably jadeite, as most of the stone beads found so far have been made of this material. Some of these necklaces at Copan, Yaxchilan, Piedras Negras and Palenque have down the wearer's back an additional string ending in a tassel [Figures 1 and 26]. An amulet of a human face edged with small round beads [Figure 9, a] appears in the front of such strings of beads at Copan, Quirigua, Yaxchilan, Piedras Negras, Tsendaes, Palenque, and even at Chichen Itza in the New Empire; usually three pendants, each of a long and a round bead, hang from the amulet, and three project from each side. At Piedras Negras a personage wears an amulet of an entire human figure. A long tubular bead, with similar rays at each end, suspended from thongs or textile strips [Figure 9, b], was worn at Copan, Quirigua, Yaxchilan, Piedras Negras, Seibal, and is seen on jades and on the pottery; a possible development from it, or else degenerate conventionalization of the Ceremonial Bar (see Copan, stela 11; Quirigua, stela C) is a flat, oval bar, with trefoil projections at the ends [Figure 9, c], found at Tikal, Quirigua, Piedras Negras, Yaxchilan and Naranjo. An oblong bar, similarly suspended [Figure 9, d], is found at Copan, Tikal, Naranjo, Cankuen, on stone figures from Copan in the Peabody Museum, and on the Chamá pottery; and an apparently inflexible carved necklace, associated by Seler with the Death God, appears at Copan, Quirigua, Naranjo, Seibal, and on the Bat God of the Guatemala pottery [Figure 9, e]; here the girdle is similar. A necklace of leaves on a narrow band is worn short at Piedras Negras and long at Naranjo [Figure 9, f]; at Palenque and Tikal an ornament of woven ribbons or



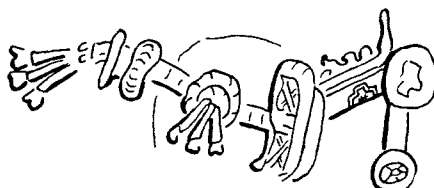
6A



6B



6C



7



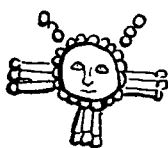
8A



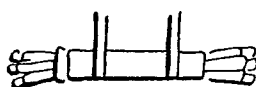
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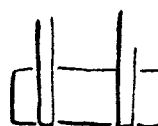
9A



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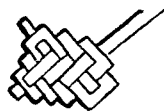
9D



9E



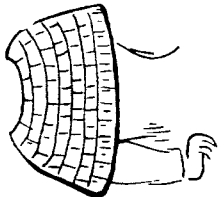
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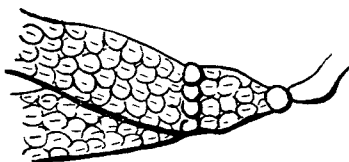
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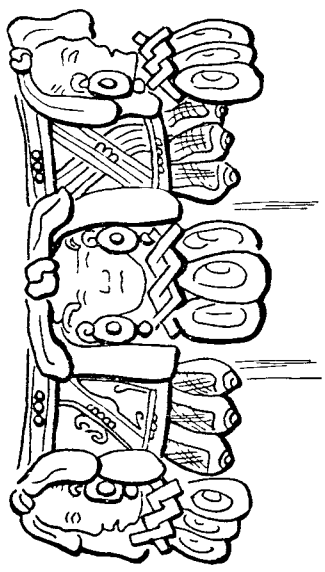
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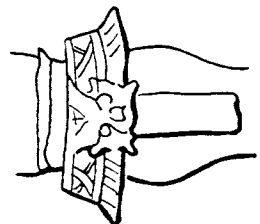
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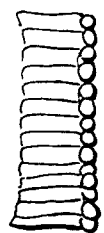
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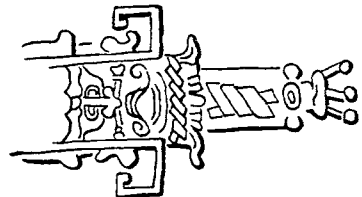
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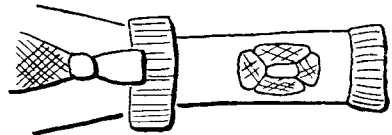
13A



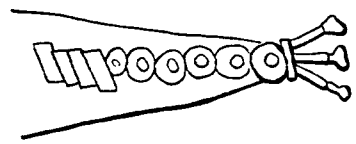
13B



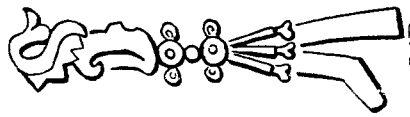
14A



14B



14C



14D

textile strips hangs at the level of the wearer's waist [Figure 9, g]; at Palenque, an elaboration of the long bead hangs from a knee-length intricately carved chain; at Yaxchilan, on the pottery, and on a jade piece as well as on a painted vase two large oval objects, probably beads, are held tight at the neck by a thong [Figure 9, h].

Circular collars [Figure 10], sometimes long enough to be called capes, made sometimes of round beads, sometimes of round and cylindrical combined, but usually of close set squares that are perhaps jadeite, appear everywhere. The long bead described above is worn with them, superimposed or suspended, as is the flat, oval bar, itself sometimes of similar squares. Amulets are often sewn on the collars, and at Copan, Tikal, Yaxchilan, Piedras Negras, Seibal, Ixkun, Cankuen, and on jade plaques, are visible in threes, one in the centre and one on each shoulder.

At Yaxchilan alone is found a sort of muffler [Figure 11], of tubular material, feather or textile, that hangs about the neck like a scarf and is knotted at the level of the waist; a similar neck ornament is seen on a figurine in the Peabody Museum, and on the pottery a short section of the same material is fastened to strings that tie at the back of the neck, the puffy crescent thus formed in front being sometimes trimmed with knots and joined with an oblong bar. At Chichen Itza a Maya chief is holding, presumably as an offering, a bunch of these same long, tubular affairs, knotted at either end.

GIRDLE. A type of girdle found at all of these sites but Quirigua and Piedras Negras may be taken as the norm: fairly wide, generally of textile in a design which may have planetary significance, with a fringe of sea shells, it has in the front and at the sides large amulet heads with three shells hanging from each [Figure 12]. Variations may lack the side heads, may have the solitary head that of a jaguar, or may lack only the central head; again, girdles of varying design may be entirely without such heads. A strange, corsetted effect is produced by a girdle several inches wider than the tightly bound waist at Quirigua, Piedras Negras, Yaxchilan, Naranjo and Seibal [Figure 13, a]. A different type of girdle that appears most frequently at Palenque and is always associated with a long or short network skirt consists of long tubular beads, set vertically close together and edged at the bottom with round beads [Figure 13, b].

The long flap hanging from the front of the girdle that Spinden calls apron, may belong to the girdle or the loin cloth underneath it. Its most elaborate form, boasting one or more grotesque faces, with frets at the sides [Figure 14, a], appears at every site; lacking grotesques, at Copan, Quirigua, Ixkun and Yaxchilan. In other forms, it is unmistakably textile at Piedras Negras and Naranjo [Figure 14, b]; probably textile, decorated with beads carved into rosettes, at Yaxchilan, Palenque, and on jades [Figure 14, c]; and essentially bead at Copan, Tikal, Naranjo, Yaxchilan and Palenque

[Figure 14, d]. At this site similar bead ornaments hang from the back of the girdle, sometimes shorter ones from the sides, and two carved chains from a man's belt support a grotesque manikin swinging behind him. This occurs also at Tikal, where a grotesque head may be similarly hung from a seated figure on a lintel.

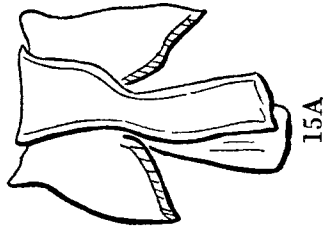
LOIN CLOTH. The traditional Maya loin cloth, that wrapped around the waist in a wide band with long ends before and behind, is shown on the pottery; a variety with front flaps and a shaped skirt [Figure 15, a], shown at La Mar, must have been worn under girdles and tunics, for we have skirts that undoubtedly belong to such garments, of textile at Yaxchilan and Piedras Negras, of network at Tikal, Piedras Negras and Palenque, of jaguar skin at almost every city. A loin cloth that wraps around with a long triangular apron front appears at Palenque, Piedras Negras and Yaxchilan [Figure 15, b].

SKIRTS, ROBES. Long skirts of the network that seems to be diagonally woven of round and cylindrical beads [Figure 16] are found alone at Copan and Palenque, over textile at Naranjo, and over jaguar skin on stela H at Copan. At Naranjo a long textile skirt is worn under a long feather cape; at Cankuen under an apparent network dress, much like the network garment covering a cat-faced figurine from Chamá. At Tikal, Piedras Negras and Yaxchilan elaborate robes, probably embroidered, are fastened over the shoulders [Figure 26].

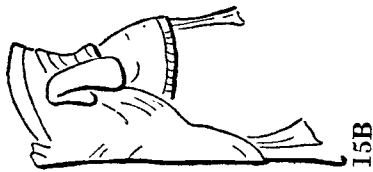
CAPES. Short capes are of network at Copan, Palenque and perhaps Naranjo, of skin at Tikal and Yaxchilan. Feather capes are long in front at Naranjo and Piedras Negras, long behind at Tikal, apparently only over the shoulders at Copan, Piedras Negras and Naranjo [Figure 24, b]. At Yaxchilan and on two figurines in the University Museum occurs a cape, long behind, that may be feathered, quilted, or plain textile, and on a Copan stone figure in the Peabody Museum, there is a short, richly embroidered textile one.

Tunics, probably of the same close set squares of which collars were made, are worn at Piedras Negras and Yaxchilan; one of jaguar skin at Yaxchilan, and here also a woven variety with bead rosettes.

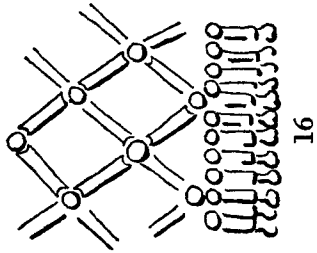
ACCOUTREMENTS. Almost every sculptured figure carries some object of practical use or religious significance. Military implements are fairly common; the spear appears in every city but Copan and Quirigua; a short one, resembling a javelin, is found at Naranjo, and the man on stela 2 at Cankuen carries a bunch of short javelins like those used with the atlatl. Ceremonial types include an openwork variety found also at Chichen Itza, as well as at Tikal, Naranjo and Itzimte Sacluk [Figure 17, a]; varying snake head kinds and one that ends in a hook, at Piedras Negras [Figure 17,



15A



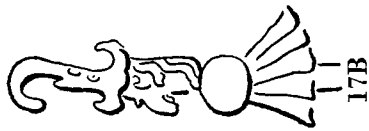
15B



16



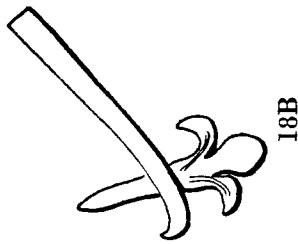
17A



17B



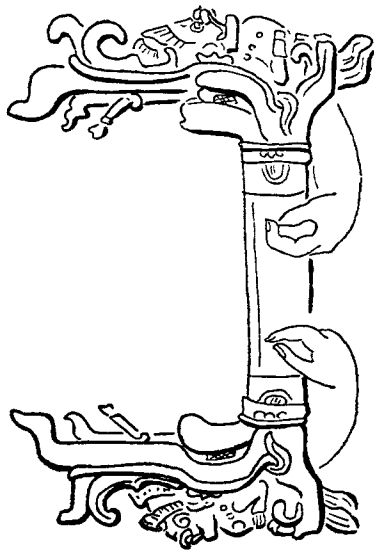
18A



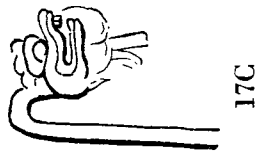
18B



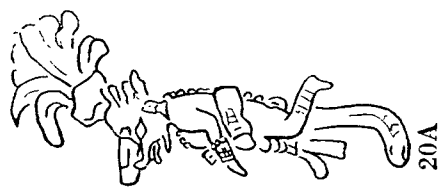
18C



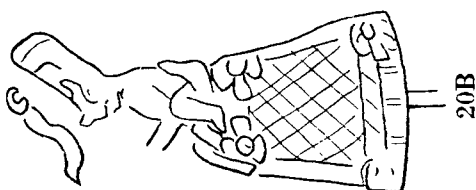
19



17C



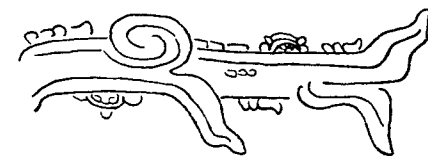
20A



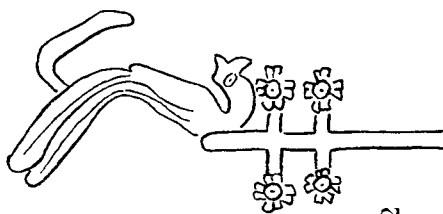
20B



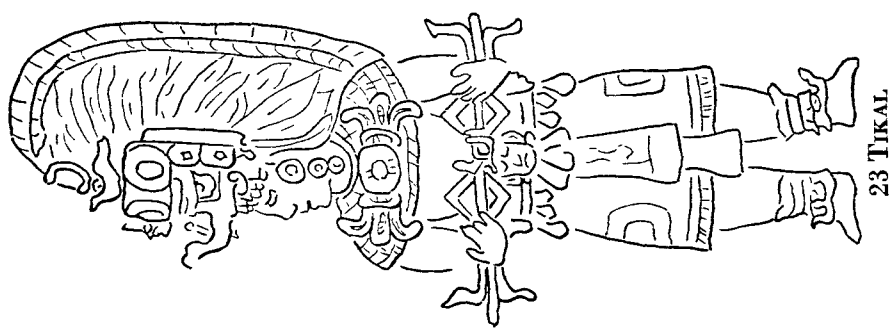
20C



21



22



23 TIKAL

b]; and long staves at Naranjo, Ixkun and Tikal. Shields, worn on the left forearm, are round and small, representing usually a human or grotesque face at Tikal, Quirigua, Ixkun, Itsimte Sacluk, Yaxchilan, Naranjo and on the jade plaques; larger and oblong at Piedras Negras, Naranjo and Cancuen, and on a figurine from the Highlands of Guatemala. On a Chamá vase a large oblong shield stands behind the chief, and at Palenque a large round one stands before two crossed ceremonial spears. At Tikal, Yaxchilan and Tsendaes, human or death's heads are slung presumably as shields at men's backs; the reverse of stela H at Copan shows what may well be intended for the same thing. At Yaxchilan we find a stone knife on lintel 26, jaguar claw clubs on lintel 6 and a feathered club on the deity side of stela 11.

Figures carry small bags or pouches of varying shapes and stuffs at Piedras Negras, Yaxchilan, Tsendaes, Naranjo, Seibal, Palenque and Tikal; a foliated one on stela 30 at Naranjo [Figure 18, a] is duplicated in that carried by a Toltec at Chichen Itza; and an object of the same shape on a vase may be bag or fan. An axe with trefoil edge [Figure 18, b] occurs at Yaxchilan and Palenque; stave-like torches decorated with a Maltese cross at Yaxchilan; short cone-like torches at Yaxchilan and possibly on the pottery, and what may be torch or foliated stave at Yaxchilan on lintel 24; a round fan, long-handled and feather-edged at Yaxchilan, short-handled at Naranjo, and woven or braided on the pottery. A strange object is one made perhaps of feathers, perhaps of scales, carried in the hand on stela 13 at Naranjo and on a vase, and worn apparently suspended from the headgear on lintels 6 and 43 at Yaxchilan [Figure 18, c].

Religious importance is attributed to the Ceremonial Bar and the Manikin Scepter. The first, a short bar with a human head between the snake jaws [Figure 19], is found at Quirigua and Copan, the snake body a pendant curve on the three earliest stelae at the latter site. At Tikal, an entire figure rests in the serpent's mouth. The bar is short without human heads in two Quirigua stelae; long and decorated with planetary signs at Seibal; the same, with masks in the serpents' jaws, on stela 4 at Yaxchilan, and long with human heads but no symbols on the bar on stela 1, and at Naranjo. The second, in its usual form of the Manikin God held by his snake leg [Figure 20, a], occurs at Tikal, Quirigua, Itsimte Sacluk and Yaxchilan; at the last-named site the same god appears seated on a braided truncated cone that is mounted on a long staff [Figure 20, b], and it is probably he who, seated or reclining on a cushion, is held aloft on the sanctuary tablets at Palenque. Here, at Tsendaes and Piedras Negras, is found the form of the Manikin Scepter that is reduced to a head on a staff [Figure 20, c]; the child in arms at Palenque who has one leg a snake's body and head may be another manifestation of the same deity. A type of flexible shield, probably representing water [Figure 21] (see *Dresden Codex*), seems to be an object of adoration at

Yaxchilan, is held, in abbreviated form, by a worshipper and worn in a headdress at Palenque; and hangs from the jaws of the Ceremonial Bar snakes at Quirigua. A conventionalized tree with a bird at the top [Figure 22] is carried at Yaxchilan, a tree not so conventionalized on a jade plaque. A basket appears generally as an adjunct of the thorn-knotted penitential rope at Yaxchilan, but seemingly secular in its use at Naranjo and on the pottery; a small tied bundle is borne by minor figures at Yaxchilan; a feathered jaguar head is being presented to the possible god on lintel 26 at that city; and on a Chamá vase two men carry bones painted red on one end. A snake is held vertically by the figure on a Quirigua incense-burner and by both persons on a Palenque relief; a snake with a god issuing from his jaws appears first between two men, on Yaxchilan lintels, its body held by the man on the left, then, unsupported, to a solitary worshipper.

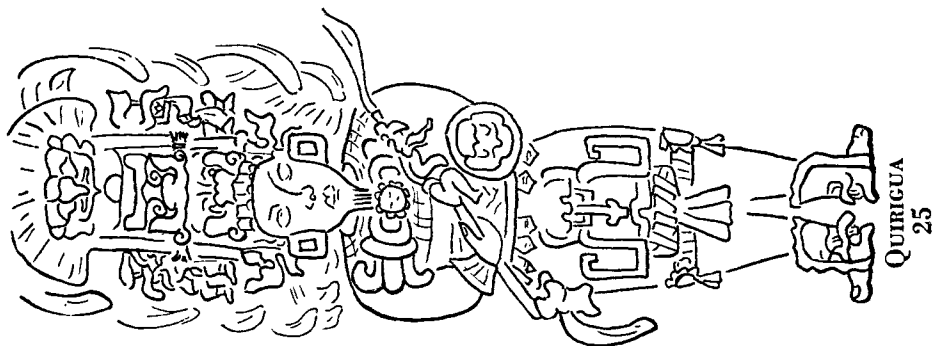
A mask is worn over the face of the principal figure on monuments at Copan, Tikal, Yaxchilan and Palenque; the object carried by the man on stela 8 at Seibal may be such a mask, and the scale arrangement close-fitting about the face on stela 11 at the same city [Figure 6, a] may be a degeneration or an impressionistic rendering of one. Small figures that may be related to those in the panel glyphs at Quirigua play about in the intricacies of the Copan and Quirigua headdresses [Figures 24, a and 25] and hover over the demolished head on lintel 5 at Piedras Negras.

II

In spite of this general distribution of articles of dress, there are costumes at each site typical of that city, and certain objects not yet found elsewhere.

TIKAL. Men at Tikal wear a snake mask headdress, collar with foliated bar, and a shell-fringed three-headed girdle over a skin or net skirt [Figure 23]. This is the only place where we find a headdress showing the wearer's head between the realistic jaws of a scale snake [Figure 5, b]; where the open-work spear is held horizontally or aslant across the body; and where an entire figure rests in the jaws of Ceremonial Bar snakes.

COPAN. At Copan there are two distinct divisions, the standing figures of the stelae [Figure 24, a] and those seated in rows about the altars and along the step found by Maudslay [Figure 24, b]. The men on the stelae wear towering headdresses, with tiny figures, sometimes animal-headed, popping in and out of the folds; shell-fringed three-headed girdles that here alone have straps — plain, knotted or grotesque — hanging between the heads; sandals and cuffs that are adaptations of a snake's head; square-set collars that are half-hidden by the Ceremonial Bars they bear. Only at



QUIRIGUA
25



COPAN
24B



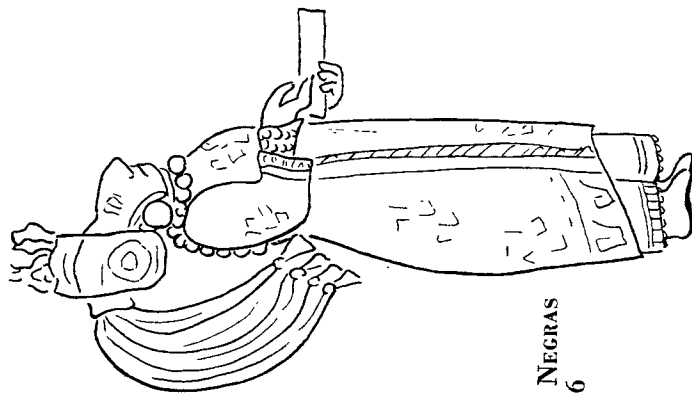
COPAN
24A

Copan do we find this article with the bar replaced by a realistic snake body. Stela N seems to represent a water, presumably crocodile, deity; stela I shows a man in a mask (probably the face of God D, portrayed in the heads on his girdle) carrying a dead snake, with the three-member underworld symbol at the top of his headdress. On two stelae occurs the horizontally folded turban which is such a marked characteristic of the seated figures.

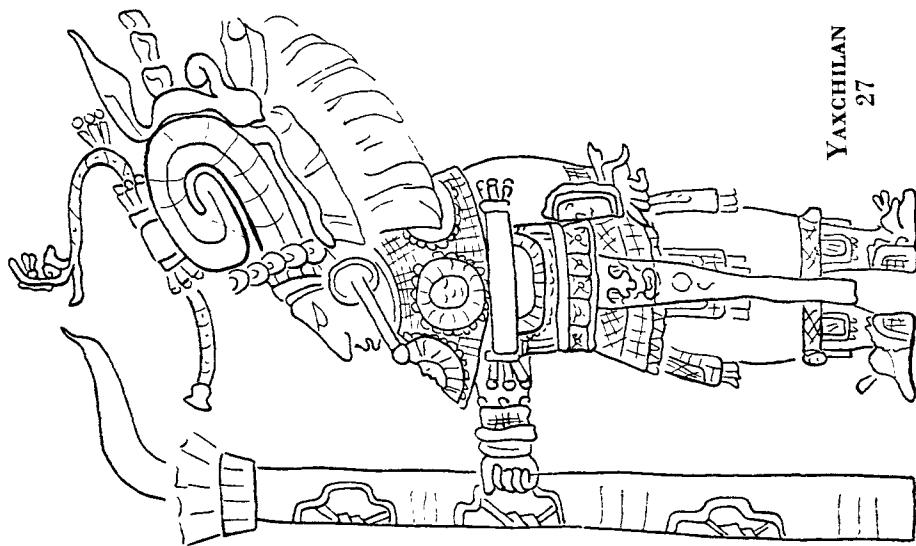
This turban appears on thirty-six of the forty-two figures on altars and step; two of the remaining six wear a round turban with the scroll front that is found nowhere else. The rest of their costume consists of the traditional form of loin cloth, and neck ornaments of the horizontal long bead — hung singly, in pairs, or three together — or two snakes, from whose knotted heads hangs a bead-fringed tau-shaped ornament that sometimes develops into a jaguar head; almost all wear short feather shoulder capes.

QUIRIGUA. The typical Quirigua costume [Figure 25] would be a high headdress of superimposed masks; a collar with three amulets or a scale foliated bar, the latter found where a Manikin Scepter is carried; a shell-fringed girdle with one central head and grotesque, fretted apron; bead knee bands with an amulet in front, and sandals with a grotesque face. A Ceremonial Bar is found here with water pouring from the snakes' mouths. On the north sides of stelae A and C, that is, the side toward the mound before which they stand, are symbolical or masked dancing figures, with the head in profile, and with highly conventionalized girdle, headdress and Ceremonial Bar.

PIEDRAS NEGRAS. Only at Piedras Negras do we have definitely militaristic scenes. Lintels 2 and 4 both show a captain facing a file of soldiers; and stela 12 shows captives, guarded by soldiers, being presented to a chieftain by a presumable priest. Also at this city is a unique series of stelae that show persons of great importance seated in canopied niches. A man with a snake-snout headdress, with or without the geometrically conventionalized lower jaw, or in a vertically folded turban, wearing a collar and loin cloth with elaborate textile flap, or wrapped in a robe, would be characteristic of this site [Figure 26], as would one in a girdle of close set squares fringed with rows of shells, beads and perhaps embroidery, with skirt or loin cloth showing below, wearing embroidered knee bands, a collar of alternating round and cylindrical beads, a feather holder erect or on its side somewhere in his headdress, and carrying an oblong shield and a spear practical or ceremonial. Only here on the monuments do we see shepherd's crooks ending in a snake's head [Figure 17, c], and spear ends where a conventionalized snake god's head becomes a sort of boat hook [Figure 17, b]. The coincidence of crook and headdress with lower jaw on stelae 26 and 31 makes one feel that they represent the same person. The chief warrior on lintel 2 and the figure on lintel 35 also strongly resemble each other, having identical collars, with an unusual border



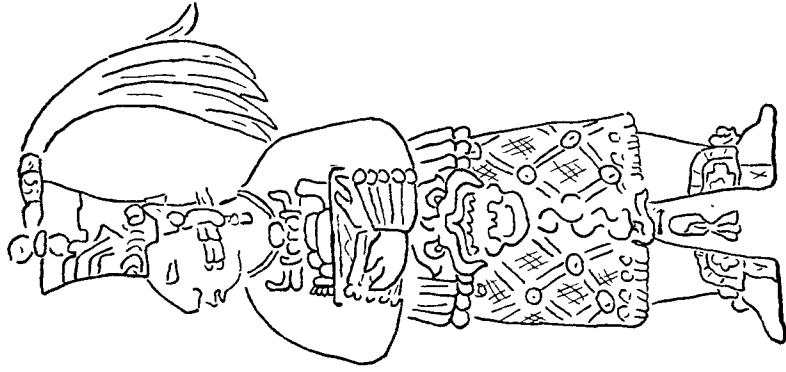
PIEDRAS NEGRAS
26



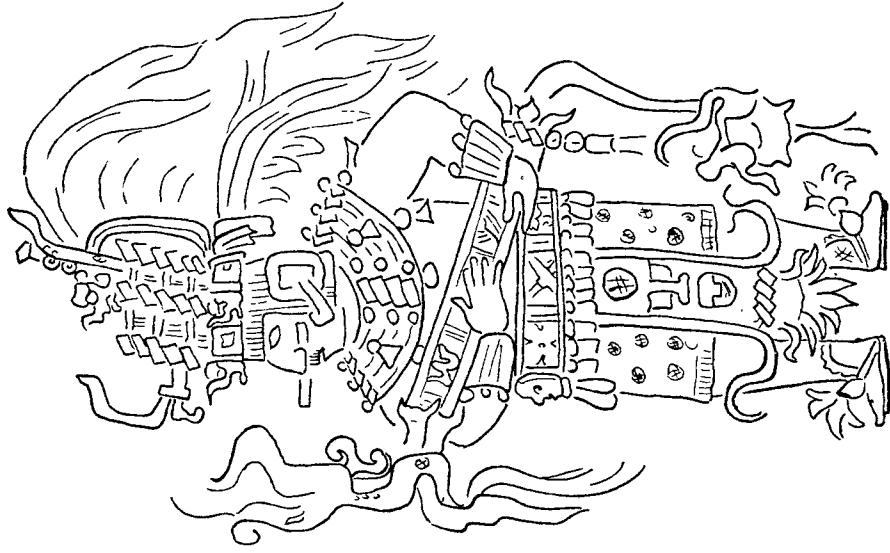
YAXCHILAN
27

ornament, identical shields, bags, and textile aprons decorated with a four-petalled flower, and similar headdresses and girdles. These identical costumes on different monuments are in both cases dated within a few years of each other, which may indicate actual portraiture.

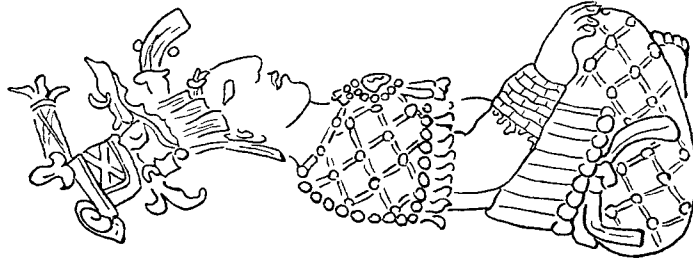
YAXCHILAN. At Yaxchilan the atmosphere seems to be almost exclusively religious; practically every carving shows a person receiving or holding ceremonial objects. Characteristic of this city are figures in reptile head-dresses that seem more apt to represent the snake god K than an actual serpent, for the eye is almost always above the nose rather than behind it. They wear square-set knee bands, collars and long robes; or collars with three amulets, accompanied by elaborate headdress and varying girdles [Figure 27]. A characteristic girdle fits tight at the waist and flares below; one portion or the other is generally decorated with beads or the ubiquitous close-set square. Unique here are the bird and tree object [Figure 22]; the penitential rope; large stave-like torches decorated with Maltese crosses [Figure 27], and small cornucopia ones; and various elaborations of headgear such as the geometrized snakes of lintels 8 and 24, the striated textile head-dresses referred to above, and applied long beads, openwork spears, and small superimposed shields. A tunic with rosettes probably of beads, is found only here, and with it there is always the muffler [Figure 11], that mysterious neck adornment peculiar to Yaxchilan. Twice, the man who wears them carries a flexible shield, once, a knife; where he wears a muffler but no tunic he holds a spear, and, on lintel 45, a spear and flexible shield. Only at this site do we have a snake appearing with a god issuing from his jaws. There are at Yaxchilan three cases of almost complete identity between figures on different lintels. The first, lintels 6 and 43, shows the main figure on each relief wearing an animal mask headdress with long beads attached vertically at the sides, a collar with three amulets and pendant long bead, a tied girdle with a jaguar head in front, what seems a bordered tunic but may be upper arm and thigh bands, elaborate amulet knee bands and sandals. They have nose plugs that turn up with a flare at one end; a strange feather or scale chin strap, or pendant from the headdress, and carry the beehive type of Manikin Scepter. In the second case, lintels 1 and 42 show the main figure — on one lintel turned away from the lesser, on the other turned toward him — wearing a striped or folded textile headdress with two superimposed small shields and a long bead at the side, a collar with three amulets and pendant bead with a semi-circular flap hanging from it, a flaring girdle with tabs below it, scale knee bands, sandals, holding in the right hand a Manikin Scepter, on the left wrist a round shield. In the third case, lintels 3 and 7, both figures have headdresses of a curled snake tail surmounted by three beads and two more tails, shell-fringed girdles with three heads, fretted aprons, a round shield on the left wrist and a Manikin Scepter in the right



NARANJO
28



SEIBAL
29



PALENQUE
30

hand. Here, as at Piedras Negras, identical costumes are dated close together. The fragments of stelae 1, 4 and 6 also bear a strong resemblance to each other: at the top, we see sun and moon glyphs on either side of a mask; below, a figure with a human head slung at his back wearing a collar with three amulets, a girdle without heads, and a bead apron, holds a flexible shield [Figure 21] over a knotted and woven object that may be drum, altar or table. Offerings are laid on a similar object in a secular scene on a Chamá vase.

NARANJO. Characteristic of Naranjo is a figure in a snake or snake god headdress and a long net-over-textile skirt, carrying a filled basket [Figure 28], or else one rather like Tikal but holding aslant a long Ceremonial Bar with human heads in the snake jaws.

SEIBAL. A man wearing a collar with three suspended amulets or one made of beads in a zigzag pattern, a girdle of planetary symbols with heads at the sides, and a grotesque apron with rounded frets over a short skin skirt, whose compound visor type of headdress is built over a helmet probably of false hair, and who carries aslant a Ceremonial Bar, long and decorated with planetary signs, would be from Seibal [Figure 29]. A bib-like collar, one with a strange foliated front ornament, and a radiating beaded one, are peculiar to Seibal as is the prolonged neck bar on stela 1. Stelae 5 and 7 wear the skirted loin cloth as at La Mar, and a large, twisted bar, broken at one end, apparently glued to their chests.

PALENQUE. The characteristic dress of Palenque [Figure 30] would be a short or long net skirt and a net cape, a girdle of long tubular beads edged with round ones, hair drawn up and banded with or without supplementary trimming. The costumes on the sanctuary tablets are unique: tall cap, bead necklace and apron or shaped net loin cloth for the priest; for the worshipper, a cap with embroidered flaps, and a cloth garment that covers him from hips to neck, whence it falls in a twisted rope down his back. Here, in the (ceremonial) spears on the panel of the Temple of the Sun, is a new variety whose point is an enlarged and decorated tooth of the ubiquitous God K. Here also we make definite contact with the gods of the codices. God D, the Roman-Nosed God, probably Itzamna, appears on the east side of the sanctuary entrance in the Temple of the Cross in a costume — a jaguar skin cloak, a textile strip neck ornament, with a padlock-shaped pendant hanging from it, and a headdress in which the head of the Moan bird is the predominating element — practically identical with that which he wears while supporting the left side of the altar on the sanctuary tablet of the Temple of the Sun. At the right side of this altar, however, his attributes are essentially reptilian; the neck ornament is the same, but the headdress is a snake head one, and the god wears a dorsal strip with cross-hatchings.

III. CONCLUSIONS

Although scarcity of material makes generalization dangerous, scenes on the pottery, clearly those of daily life, that show even nobles wearing only headdress, necklace and loin cloth, emphasize the ceremonial character of the clothing on the stone reliefs. The quasi-sacred nature of such costumes may account for the apparently static fashions during a period of four hundred years, as witness the clerical robes of to-day. The variations in costume, therefore, are local rather than chronological. Hence, the appearance in only two or three places of articles of costume which are neither confined to one site nor yet widely distributed, shows a perhaps significant contact between cities where there is as yet no other proof of close interrelation.

The network clothing that makes the characteristic costume of Palenque [Figure 30] so distinctive is not limited to that city alone, for capes, long skirts, and short skirts appear plain or over a skin or textile foundation at Tikal, Naranjo, Xupa, Piedras Negras and Copan, while a figurine from Chamá, and a stela from Cankuen show what seem to be complete dresses of this material. Always, however, except at Xupá, a small town not far south of Palenque, and at Copan, the use of network is, according to our evidence, an adaptation, not a duplication of the Palenque style, for it takes forms not found at Palenque, and omits the typical combination of long skirt and cape with a long bead girdle. At Copan this occurs twice, on monuments probably erected within a year of each other; stela H, strikingly different from all the other stelae, and altar T, where the persons wearing this costume seem to be in the retinue of two men in a costume more characteristic of Copan itself. They are interspersed with bird and animal headed creatures and may be taking part in a dance or some other religious rite. The cat-headed figurine from Chamá may similarly be a masked dancer. These isolated occurrences at Copan, at the beginning of the sixth century, of a costume identical with that characteristic of Palenque would seem to prove that the latter was a flourishing city with far-flung relations of trade or war by A. D. 523. It is interesting to note in this connection a figurine, in the Peabody Museum, of a woman in a blouse of similar openwork diagonal weave, but obviously cotton, resembling in fact Sahagun's description of cotton clothing worn by the sixteenth century Mexicans.

Palenque and Tikal share two unique adornments: the manikin figure swinging behind a sculptured personage by chains from the side of his girdle, and the neck ornament of woven textile strips [Figure 9, g]. The latter is an object interesting in its connotations. On Chamá pottery this occurs as a design on a necklace, and it is repeatedly used as decorative detail in costume in the carvings of Copan, Palenque and Quirigua. In the codices it occurs as a mat, from which Dieseldorff calls it the Pop motive from the Maya name for mat. If there were any basis for this connection, one would expect to

find the braided motive in the glyph for the month called Pop; and here it indeed occurs, in the form of the glyph used on the monuments — its only occurrence among the glyphs. The Maya title for prince was Ahpop — hence this symbol would seem to indicate authority and princely position wherever it appears. The stela at Tikal on which it is worn as a necklace is early — A. D. 215, according to Spinden's correlation — and one would like to think that, since the necklaces at Palenque are its only other appearance in this form, there must be some close connection between them. The question, however, of the age of the Palenque temples is as yet unsettled. The dates on them are fairly early, ending in the middle of the fifth century, but according to the architectural development of the Guatemala cities, Palenque is the latest and most highly developed of all; hence it has been thought that the temples there were erected toward the end of the Old Empire and that the dates recorded refer to events far in the past. Be that as it may, the Pop neck ornament may prove a link between Palenque and the early Empire. An ornament on a Seibal headdress of two interwoven double-headed snakes probably derives from this motive, and is practically identical with the woven snake motive used in Mexican art with Tlaloc, Coatlicue and other deities.

Feather garments appear only at Tikal, Copan, Piedras Negras and Naranjo, though a cape of dubious fabric may include Yaxchilan; and embroidered robes only at Tikal, Piedras Negras and Yaxchilan. There is a headdress with rosettes in front and a sort of hinged elbow behind [Figure 7] that occurs only twice, once at Piedras Negras, A. D. 442, and once at Tikal, A. D. 481. This may mean close contact between these cities, monuments erected to a hero whom they shared, or merely that we know only two examples of a widely distributed form of headgear. In the same way the resemblance of a solitary puff ball turban at Piedras Negras [Figure 3, c] to those on the pottery from Chamá and Nebaj may or may not be important. The openwork spear [Figure 17, a] is found only at Tikal, Naranjo and Itzimte Sacluk, though it reappears at Chichen Itza. Piedras Negras, Yaxchilan and Cankuen show a warrior in a snake tail headdress, and the harness, also found at Naranjo, that may be textile or closely woven beads, and includes skirted girdle, possible tunic, and, at the last three sites, tabs hanging from the shoulders and the sides and front of the girdle. The man at Naranjo holds one javelin just like the three on the Cankuen stela, and has a shield of the same shape though bearing a different design. These javelins are short, the only short ones on the old Empire carvings, and identical with those carried for use with the atlatl by the Toltec warriors on the Chichen Itza Tiger Temple frieze. There is, however, no representation of the spear thrower itself, unless it should be the partly obliterated object in the right hand of the Cankuen warrior.

A new element enters in the identification by costume of deities or historical personages. The cases cited of identical costumes on different monuments seem to show human beings rather than divine, with the exceptions at Yaxchilan of the man holding a flexible shield over a possible altar on stelae 1, 4, and 6, and the frequent man-in-a-muffler, whose companion almost always kneels before him. There is no sure clue as to which gods these are, if gods they be, nor can we be certain as to whether they show the god himself or merely a priest in divine regalia. The startled attitude of the worshipper on lintel 16 at Yaxchilan, however, might well indicate his reaction to the personal appearance of a god.

But at Palenque we seem definitely to have three appearances of God D. He is portrayed in the two figures supporting the altar on the Temple of the Sun tablet: on one side dressed as he is on the doorway in the Temple of the Cross, on the other still with the textile strip symbol of authority at his neck, but with the rest of his costume showing snake attributes instead of jaguar and bird ones. These Atlantean figures thus seem to show this deity in two manifestations of his role as sky god. The feather crown headdress surmounted by a bird head that he wears on the Temple of the Cross doorway is duplicated by that of a god, apparently N, God of the End of the Year, on a vase from Kixpek.

This, then, is a study handicapped by scarcity of available material that yet does offer definite possibilities for throwing light on the vexed question of Maya history. Even negative evidence is valuable, for it can show us that the variation in costume is local rather than chronological, thereby indicating influences and diffusions from one city to another. If further finds should show that present apparent differences between costumes of cities of the Old Empire are non-existent, that would at least be a definite proof of cultural uniformity.

Something may be learned of the interrelation of the Old Empire with Yucatan by comparing carvings from the Peninsula with those from the Guatemala cities. The occurrence of apparent atlatl darts in the equipment of warriors of the Old Empire, for instance, will, if substantiated, mean either that Toltec influence was felt in Guatemala long before the days of the Yucatecan league, or else that this weapon, supposedly characteristic of the Nahua people, was early known to the Maya as well.

The cases of identical costumes on different monuments are so far rare enough to permit the idea that they are actual portraits. If they should prove, however, with more material, to be merely costumes typical of, perhaps, certain orders of priests or warriors, that, in itself, should help in interpreting what we know of Maya history and social organization. For this,

carvings and paintings that show two or more persons are more valuable than those with only one, for the interrelation of the figures is often an indication of their respective status.

Study of the gods of the codices, where they can be identified in the archaeological material, may throw new light on their proper classification, for here their costumes seem to be more comprehensive and more suggestive of their divine attributes than those they wear in the codices.

The possibilities of this line of research are, therefore, varied enough to warrant further investigation.

APPENDIX

FEATURES EACH CITY HAS IN COMMON WITH EACH OTHER CITY, AND,
BELOW, WHAT THOSE FEATURES ARE

	T	C	PN	Y	N	Ts	IS	Q	Ck	I	S	P	Py
Tikal.....	-	3	5	2	1	-	1	1	-	-	-	4	2
Copan.....	3	-	5	1	4	1	-	4	1	-	1	4	3
Piedras Negras.....	5	5	-	4	4	1	-	1	2	-	-	3	1
Yaxchilan.....	2	1	4	-	3	-	1	1	-	-	-	2	4
Naranjo.....	1	4	4	3	-	-	1	-	2	-	-	2	4
Tsendales.....	-	1	1	-	-	-	-	-	-	-	-	1	-
Itsimte S.....	1	-	-	1	1	-	-	1	-	-	-	-	-
Quirigua.....	1	4	1	1	-	-	1	-	-	-	-	-	-
Cankuen.....	-	1	2	-	2	-	-	-	-	-	-	1	-
Ixkun.....	-	-	-	-	-	-	-	-	-	-	-	-	-
Seibal.....	-	1	-	-	-	-	-	-	-	-	-	-	1
Palenque.....	4	4	3	2	2	1	-	-	1	-	-	-	-
Pottery.....	2	3	1	4	4	-	-	1	-	1	-	-	-

- COPAN** Tikal.....Round turban, chin strap, back shield.
Yaxchilan..Back shield.
Naranjo....Short feather cape, net cape and long skirt, inflexible necklace.
Quirigua....No skirt, snake jaw chain, elves,* inflexible necklace.
Tsendales..Back shield.
Cankuen...Long net skirt, snake snout on shield here.
Seibal.....Inflexible necklace.
- PIEDRAS N.** Copan.....Snake snout headdress, short feather capes, lower jaw headdress, round turban, elves.
Tikal.....Long feather cape, robes, short net skirt, round turban, hinged elbow headdress.
Yaxchilan..Girdle, beads; apron loin cloth, robes, snake tail headdress.
Naranjo....Short feather cape, long feather cape, leaf necklace, shell ornament.
Tsendales..Head on staff.
Cankuen...Bead girdle, snake snout on Ck. shield, snake tail headdress.
Quirigua....Elves.
- PALENQUE** Piedras N..Head on staff, short net skirt, apron loin cloth.
Tikal.....Short net skirt, woven ornament, swinging back figure, chin strap.
Copan.....Long net skirt, net cape, chin strap, snake jaw chain.
Yaxchilan..Apron loin cloth, axe.
Naranjo....Long net skirt and cape.
Cankuen...Long net skirt.
Tsendales..Head on staff.
- NARANJO** Tikal.....Openwork spear.
Yaxchilan..Fan, basket, tabbed warrior costume.
Cankuen...Javelin, tabbed warrior costume.
Itsimte S...Openwork spear.

* "Elves" refers to small figures associated with headdresses.

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YAXCHILAN Tikal.....Short skin cape, manikin scepter held by snake leg.
Quirigua....Itsimte S. manikin scepter held by snake leg.

Occurring on old Empire reliefs:

In 4 cities.

Net cape and long skirt.....	C, N, P, Ck
Back shield.....	T, C, Ts, Y
Inflexible necklace.....	C, Q, N, S
Manikin scepter (usual form).....	T, Q, Y, Is

In 3 cities.

Robes.....	T, PN, Y
Short net skirt.....	T, PN, P
Openwork spear.....	T, N, IS
Round turban.....	T, C, PN
Chin strap.....	T, C, P
Short feather cape.....	C, PN, N
Snake jaw chain.....	C, Q, P
Head on staff.....	PN, Ts, P
Snake tail headdress.....	PN, Y, Ck
Tabbed bead(?) girdle.....	Y, N, Ck
Long feather cape.....	T, PN, N

In 2 cities.

Hinged elbow headdress.....	T, PN
Woven neck ornament, swinging back figure.....	T, P
Skin cape.....	T, Y
No skirt.....	C, Q
Elves, lower jaw snake snout headdress.....	C, PN
Shell ornament, leaf necklace.....	PN, N
Tunics.....	PN, Y
Axe.....	Y, P
Fan, basket.....	Y, N
Javelin.....	N, Ck

Any object occurring more than four times is considered too frequent to be significant.

PROBABLE DATES OF ERECTION OF MONUMENTS CITED

SPINDEN-MORLEY CORRELATION

TIKAL			COPAN—Continued		
		A. D.			A. D.
Stela	9.....	215	Stela	F.....	523
	5.....	484		H.....	524
T 2	11.....	487	Stela	11.....	516
Stela	16.....	503		or (?)570	
Altar	5.....	503			
COPAN			PIEDRAS NEGRAS		
Stela	P.....	363	Stela	26.....	368
	2.....	388		31.....	378
	I.....	407		33.....	379
	C.....	470		34.....	392
	A.....	471	Lintel	4.....	398
	B.....		Stela	35.....	402
	D.....			7.....	405
	N.....	501	Lintel	2.....	407
Altar	L.....	502	Stela	6.....	427
Step	.....	503		2.....	437
Altar	T.....	523		8.....	446
				1.....	447

DRESS AND DECORATION OF THE MAYA OLD EMPIRE

PIEDRAS NEGRAS—		
<i>Continued</i>		
		A. D.
Stela	3.....	452
	4.....	
	5.....	457
	9.....	476
	13.....	515
	14.....	530
	12.....	535

YAXCHILAN		
Stela	6.....	396
	19.....	472
Lintel	9.....	476
	15.....	
	26.....	477
	42.....	480
	14.....	481
Stela	5.....	484
Lintel	46.....	486
	33.....	487
	1.....	492
	5.....	
	7.....	
	16.....	
Stela	11.....	494
	20.....	
Lintel	3.....	496
Stela	18.....	
Lintel	2.....	497
	6(p).....	
	8.....	500
	24.....	501
Stela	1.....	
Lintel	32.....	530

NARANJO		
Stela	3.....	422
	28.....	431
	20.....	434
	24.....	442
	22.....	
	21.....	447
	23.....	452
	2.....	453
	29.....	455
	30.....	
	31.....	462
	18.....	466

NARANJO— <i>Continued</i>		
		A. D.
Stela	5.....	472
		or 524
	13.....	526
	14.....	530
	12.....	540
	6.....	
	11(p).....	543
	8.....	
	7.....	550
	32.....	560

TSENDALLES		
Stela	.....	432

ITSIMTE SACLUK		
Stela	1.....	452

QUIRIGUA		
Stela	H.....	491
Altar	L.....	493
Stela	F.....	501
	D.....	506
	E.....	511
	C.....	516
	A.....	
	K.....	545

CANKUEN		
Stela	2.....	530
	1.....	535

IXKUN		
Stela	1.....	530

LA MAR		
Stela	1.....	523
	2.....	545

SEIBAL		
Stela	7.....	540
	8.....	590
	9.....	
	10.....	
	11.....	609
	1.....	
	2.....	(p)

NOTES

The map is after Morely.

A drawing of the stela at Tsendales will be found, Figure 232, in Spinden, page 197.

A drawing of the figure at Xupá is in Maler, 1901, page 21.

Jades referred to are, unless otherwise stated, in the Peabody Museum, Cambridge, Mass. The Gann jade plaque is figured in Joyce, 1927, page 171. Figurines are in the University Museum, Philadelphia.

The drawings are from the following sources:

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- Figure 1. Gordon, pl. 8
 2. Maudslay, IV, pl. 11 (d)
 3, a. Maudslay, I, pl. 92 (6)
 b. Maler, 1901, pl. 13
 c. Maler, II, pl. 32
 4, a. Maudslay, II, pl. 84
 b. Maler, 1901, pl. 31
 c. Maler, 1903, pl. 38
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- 5, a. Spinden, 1913, fig. 24
 b. Maudslay, III, pl. 78
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- 6, a. Maler, 1908, pl. 9
 b. Maler, 1911, pl. 28
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 7. Maler, 1901, pl. 14
 8, a. Spinden, 1913, fig. 1 (b)
 b. Spinden, 1913, fig. 83
 c. Maler, 1903, pl. 72
 9, a. Maudslay, IV, pl. 11 (e)
 b. Maler, 1903, pl. 49
 c. Maudslay, II, pl. 36
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 e. Maudslay, II, pl. 25
 f. Maler, 1901, pl. 21
 g. Maudslay, IV, pl. 81
 h. Gordon, pl. 30

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10. Maler, 1903, pl. 49
 11. Maudslay, II, pl. 84
 12. Maudslay, I, pl. 82

Figure 13. a. Maler, 1903, pl. 74

- b. Maudslay, IV, pl. 10
 14, a. Spinden, 1913, fig. 15 (a)
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- 15, a. Maler, 1903, pl. 36
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 18, a. Maler, 1908, pl. 42
 b. Maudslay, IV, pl. 36
 c. Maler, 1903, pl. 50
 19. Maudslay, I, pl. 82

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- 20, a. Spinden, 1913, fig. 47 (a)
 b. Maudslay, II, pl. 95
 c. Spinden, 1913, fig. 50
 21. Spinden, 1913, fig. 84 (c)
 22. Spinden, 1913, fig. 103
 23. Maler, 1911, pl. 26

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- 24, a. Maudslay, I, pl. 63
 b. Maudslay, I, pl. 92
 25. Maudslay, II, pl. 36 (b)

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26. Maler, 1901, pl. 20
 27. Maler, 1903, pl. 63

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28. Maler, 1908, pl. 39
 29. Maler, 1908, pl. 8
 30. Maudslay, IV, pl. 10

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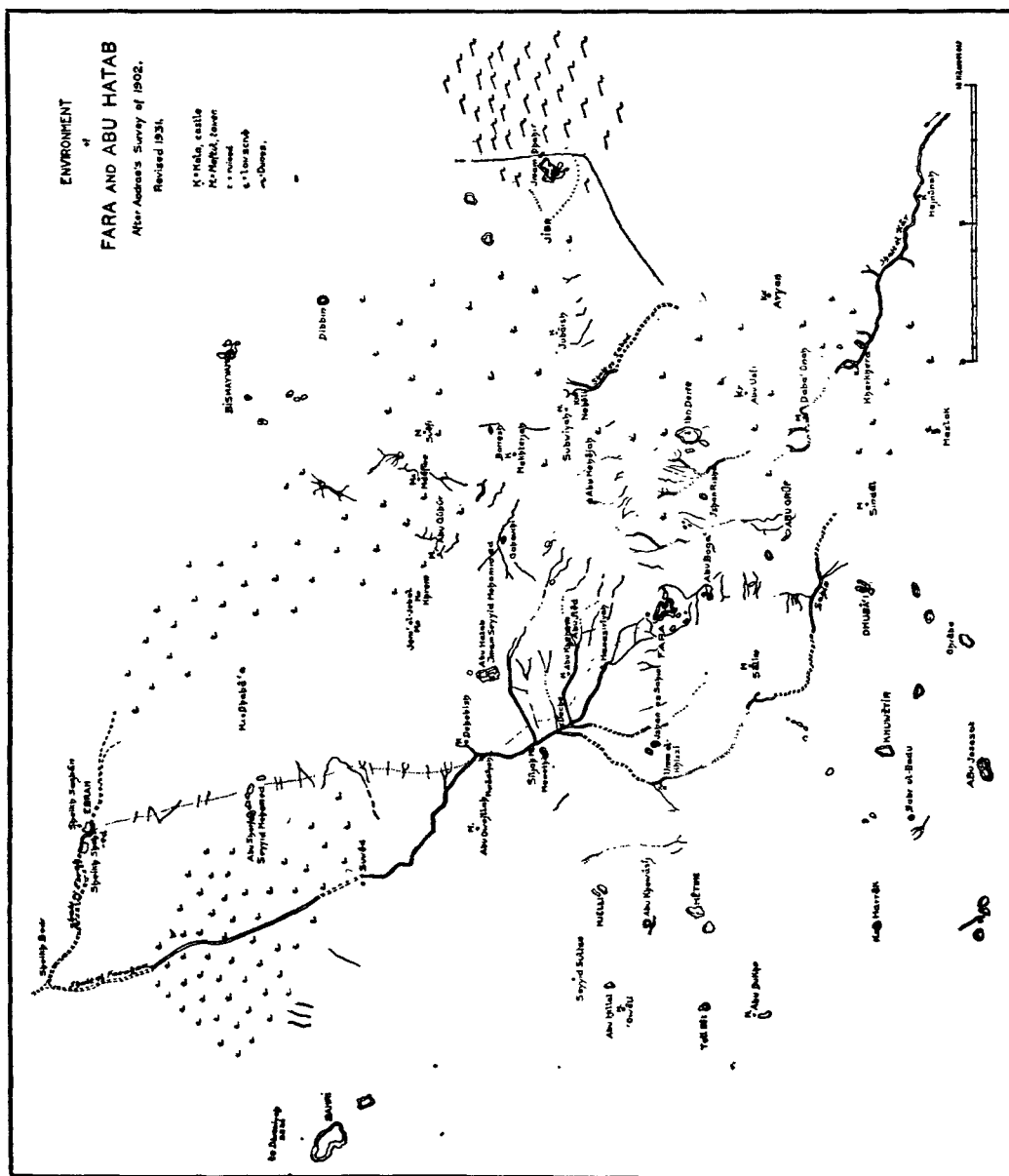
By C. LEONARD WOOLLEY PAGE 247

FARA AND ABU HATAB

After Andrae's Survey of 1902.

Revised 1934.

X = Male, castle
M = Male, tower
= ruined
= low scrub
= Dunes.



SCHMIDT: Excavations at Fara, 1931.

EXCAVATIONS AT FARA, 1931

BY ERICH SCHMIDT

[*Note: The following report is printed just as it was received from Dr. Schmidt in the field. Being a preliminary report, therefore, it contains certain conclusions tentatively drawn that further detailed study of the material might alter, and occasional instances where statements require further elaboration and documentation. It is now published, with the author's concurrence, in the belief that it is a primary duty to make available as soon as possible the results of an archæological undertaking so that others concerned with related studies may benefit by the evidence. It is also felt that Dr. Schmidt's account of the excavations at Fara gives an unusually clear and interesting picture of the conduct of archæological work, which will merit the attention of the more general reader.*

At the close of the short season at Fara, Dr. Schmidt with his staff removed to Persia, where he initiated excavations at Damghan, on behalf of the Joint Persian Expedition sponsored by the University Museum and the Pennsylvania Museum of Art. The extremely interesting results of the first few months' work will be published in a forthcoming issue of the Journal.

It is anticipated that Dr. Schmidt will resume work at Fara during the coming winter.]

IN our memory Fara camp will live on as a strange, forlorn spot in the Mesopotamian desert. We shall think of the furious sandstorms sweeping across the alluvial plain and hurling barrages of dust on camp and mound. The weather beaten walls of our temporary house trembled for days under the assaults of the gales. Our makeshift canvas roofs were torn to shreds. Bricks thudded down from the crumpling wall tops, the contours of which were fantastic in the fog of dust and sand. Though blinded and maddened at times by the continuous raging of the elements we tried to work on, and it rarely happened that the whistle sounded announcing the end of the day's work—and resignation for the time being. The situation became catastrophic only when sandstorms were followed by cloud bursts at night. There was little sleep during such times. Everybody stood by and protected records, objects and tents. Thus nothing was destroyed and the next morning saw tragicomical scenes of "housecleaning."

The climatic conditions delayed the completion of the test about two weeks. It was fortunate that relatively quiet and sunny days toward the

end of April speeded the last phase of the work, namely the final drafting of surveys, the drawing and photographing of specimens, the detailed scientific cataloguing, the combining of all information gathered, and so on. In this connection, the division of labor may be explained in short. The organization of the work and the recording of objects, architecture, and burials, was in the hands of the field director, who was aided in every phase of the expedition's activities by Mr. Derwood W. Lockard. The latter took care of the entire office work also. Dr. S. N. Kramer, an Assyriologist of the University of Pennsylvania lent to the Expedition through the courtesy of the American Schools of Oriental Research, worked up the considerable number of cuneiform tablets that appeared during the test. Mr. Erskine L. White together with Mr. Kurt Leitner made the maps of the excavated structures and the surveys on the mound, as far as they were necessitated by our plot system supplementary to the former German surveys made by Drs. Andrae and Noeldecke. The two surveyors made also the cross-sections of pots and the drawings of sherds in addition to various other duties. For a period of about ten days we hired a Mr. Bessinger from Baghdad to photograph our specimens. Baba Georgis was an efficient and industrious foreman.

The laborers were an untrained lot of Arab tribesmen of the Derre division; but, as usually, after a time a few excelled and could be used for more delicate jobs. Two sub-sheiks of the Derre tribe had to be employed for diplomatic reasons, as foremen. The same position were also held by a town Arab from Afej. The rest of the crew was divided into pickmen, hoemen, and basket carriers. At high season a hundred and forty men were on the payroll, while the average crew was about seventy men. Only a few boys were employed as basket carriers. The workers left their women in the villages or in the small town of Ebrah, twenty-three kilometres away, where most of them had their homes. While they were in our employ they lived in semi-subterranean, circular, wind shelters near our camp. Now and then they sang their monotonous tunes or they danced a wild "hosse" when coming from the mound after the end of the day's work. Many of them had probably fought in the rebel army of 1920; but they are peaceful now, and besides that, the "big birds," meaning airplanes, now and then roaring above the desert, inspire their respect for the Baghdad government.

Excepting Dr. Starr, no Occidental visited the out of the way tell during our stay. Once in a while an official from Ebrah or Afej appeared and once a group of boy scouts, neat and well trained little chaps, from Ebrah, came with their teachers to look at the diggings. We transported them in our truck, and gave them some sweets and tea. They had a good time singing their national songs, waving their flags, and looking at the skeletons in the trenches.

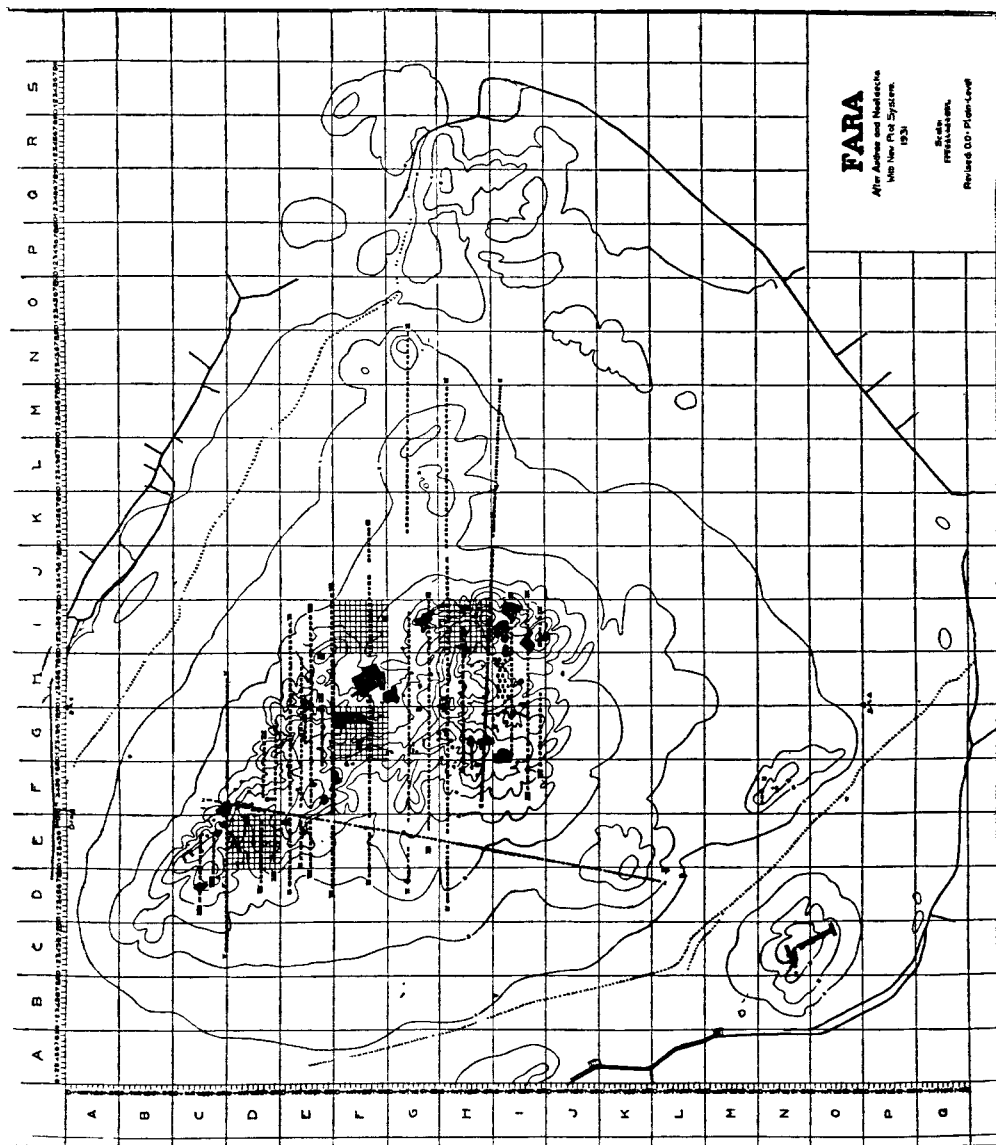
THE FARA MOUND AND ITS ENVIRONMENT

The Fara landscape as seen from the crumpling "parapet" of the camp tower or from the mound top, is almost depressingly monotonous. As far as the eye can see the yellowish brown sandy desert stretches to the East, to the North, and to the West, and suddenly drops off at the horizon. On sunny days dozens of whirligigs will march across the plain and a few tells such as Abu Hatab, Ibn Derre and some lonely watch towers or kalas will float above the horizon. Scattered dots mark patches of low scrub which grows in the shallow depressions turning to swamp in times of inundations. To the northwest, beyond the tell of Abu Hatab lies Ebrah, the nearest town, twenty-three kilometres away; but the "mileage" of the Ford shows thirty-one kilometres as traveling distance. One hundred kilometres further is Diwaniyah, our railroad base. About 300 metres off the camp a dirt heap marks the rim of a well which we dug hoping to find water. We struck ground water at 9 metres below the surface; but it was salty and could be used by the workers only to make bread. Thus our Ford had to continue carrying water over a distance of twenty-three kilometres from the region of Ebrah.

However in spite of its inhospitable climate, its sandstorms, and its sporadical cloud bursts, its tropical heat in summer, its lack of water and its monotonous scenery, there is a certain greatness and beauty in the apparent endlessness of the desert, in the playfulness of its mirages and in the colors painted by dawn and dusk. Last, not least, the archaeologist prefers an arid desert climate to any other, because there is at least a chance that remains of perishable nature are preserved while moderate moisture speeds the process of decay. In this respect the Peruvian coast and Egypt and the caves of the Southwest are the most ideal spots. The Mesopotamian desert is still somewhat "too wet."

Returning to our watchpost on the tower and looking south we see a part of the panorama of the Fara mound spread before us. Close to camp the ground gradually rises, until about 250 metres away the marked mound formation starts, which at some points reaches 10 metres of height above the level of the plain. The map of the tell shows a rough oval, its long axis extending for a distance of about 1800 metres from northwest to southeast. The main elevation, however, is only about one kilometre long and about 550 metres broad. Several lower elevations rise inside the periphery of the ruin territory.

The unattractive appearance of the mound surface has been described. The German excavators, Drs. Andrae, Baumgarten and Noeldecke, members of Koldewey's Babylon Expedition, had turned a great volume of the mound deposit during their successful excavation in 1902-1903, but they did not have the means to remove the excavated dirt. Thus the original profile of



SCHMIDT: Excavations at Fara, 1931.

the hill has changed somewhat, considering the numerous depressions and elevations due to the excavations. However we emphasize again that large scale operations can start and proceed while a sufficient number of lorries carry off the old dump soil.

AIMS AND METHODS

For the sake of the information as such and in order to determine whether large scale operations would be advisable, we were to test Tell Fara as to the depth of its deposits, the duration of its inhabitation, the sequence of cultures and their inter-relations and as to its archaeological and historical importance in general.

The character of the task and the shortness of the season combined determined the process of the test. We had to concentrate our efforts on a few selected spots and we had to apply a "fine screen" method to catch all that information which would otherwise be obtained with more ease by the repeated checking during large scale operations. In contrast to the trenches of the German excavators the very lengths of which indicate that they concentrated on the upper layer of the mound, we divided the tell into 100 x 100 metre quadrants which were subdivided again into 10 x 10 metre squares, or excavation units. The great extent of the ruin territory and, at the same time, the size of our task is emphasized by the pathetically small dots on the map marking the seven test squares from which the following information and objects have been obtained. In one square only, and inside a circular brick shaft, we had time to penetrate to the mound base. However, we shall explain below that even such limited excavation plots can furnish a reliable miniature cross-section of extensive deposits. For the sake of curiosity we may mention that the main elevation of Tell Fara covers an area of about 3500 ten by ten metre units while the total ruin territory is spread over an area which includes about 14,000 of our excavation squares.

All test plots (DE 38, 39; FG 42, 43; FI 96; $\frac{1}{2}$ HI 47, 48, $\frac{1}{2}$ 58) were situated in the main elevation of the tell. The apices of the latter had been disturbed thoroughly. Thus the test sites had to be chosen at points of medium height (three to eight metres above the plain). In the twin plots DE 38, 39 we penetrated to the original surface which was 6.50 to 6.75 metres below the northeast corner of DE 39. However due to a technical reason, namely the removal of the dump dirt from the deep excavation, we had to terrace the ground and reached, finally, the virgin soil in little more than half a square (DE 39). The objects were recorded according to their depth below the surface or if possible according to their associations with structural remains and with burials. Thus we obtained in Plots DE 38, 39 a complete series of superimposed remains reaching from the mound surface to the base

of the deposits and in the other test plots we gathered additional information about the historically most "communicative" upper strata of the tell.

In order to give an idea of our recording system we may follow the way of a pot from the ground to the complete record. The vessel is first mapped in the plot sketch together with its associations and find-spot data and receives its current find number within the plot. Then important specimens are photographed. If they are associated with burials, additional sketches are drawn. Washing and mending if necessary follow. In the evening after the end of the excavation, the finds of the day are entered in the field catalog. For the sake of speed and in order to keep everybody informed about the progress of the work, the whole staff takes part in the event. Leitner washes the specimens, Schmidt enters them in the current catalog and dictates at the same time to Lockard who types the filing card series, while White numbers the objects. Detailed descriptions of pots are entered during the last phase of the season on special blanks forming the final record together with drawings of designs, cross-sections and photographs according to scale. In spite of the team work the cataloging lasts until about 9:00 P. M. on many days, while the whistle calls at 6:00 A. M. for the start of the excavation. Following the customs of the country we consider Friday the day of rest and use it for laboratory work.

The instrumentarium for the excavation proper includes large and small picks, shovels and trowels, baskets, whisk brooms, bellows, paint brushes of various sizes and a set of "raspatoria," that is, surgical scrapers ideally fit for delicate work, at burials for instance. Paper boxes and bags were made to order in Baghdad. We could not afford a field railroad for our small test, but at some future time we hope to get a compressor which would clean the architectural remains with regulated currents of air at a great speed. Other equipments such as cameras, photographic scale apparatus, surveying instruments, have previously been described.

THE EXCAVATION

The excavation began on February 23 with forty workers; but their number soon rose to one hundred and the time sheets show the maximal crew of one hundred forty-one workers for the period from March 6 to 19. Then the crew diminished gradually until, towards the end of April, thirteen of the best men only were left for the detail work.

The first test plots were DE 38, 39.¹ Here we gained an idea of the immense fertility of the Fara deposits. Almost directly below the thin surface layer of loose, dust-like dirt, appeared the first rich burials of the

¹"D" signifies the WEST-EAST series of 100 meter quadrants, "E" the NORTH-SOUTH series, "DE" the quadrant in which the 2 series overlap; while the 10 meter squares are determined in the same way. All maps are oriented toward the NORTH.

EXCAVATIONS AT FARA

Early Sumerian period. A drainpipe also reaching nearly to the surface [Plate II, 2] contained dozens of the valuable archaic tablets which had been discarded by their owner. Many pottery vessels, some alabaster vessels, seal cylinders and other objects of pottery and stone appeared. Specimens of bone and metal were rare. The structural remains of the upper layer were insignificant and badly preserved.

When the base of the first definite occupational level was reached at an average depth of 1.0 to 1.70 metres below the surface, the entire crew was transferred to the next test site, Plot FG 43, which was soon expanded to include FG 42. The excavation proceeded here while the maps and the cross-sections of the first test were made, and while the burials and the architecture were worked up. The general run of the finds in Plots FG 42, 43, was about the same as in DE 38, 39, though one archaic tablet only occurred. However FG 42 gave us our artistically most striking finds, namely three labels with impressions of seal cylinders, two of which are perfect examples of the Sumerian stone cutter's art. In Plot FG 43 we were fortunate enough to strike a segment of one of the "round constructions" the purpose of which had puzzled the German excavators thirty years ago [Plate III, 1]. Of course we decided to excavate the circular construction and we found the immensely interesting information about Fara III which will be described below. Again many well equipped burials occurred in FG 42, 43. Storage pots were frequent in the relatively well defined building remains. The crew was soon split up into small groups working in the individual rooms. When the space became crowded a new test site, Plot FI 96, was started and after the upper level of DE 38, 39 had been worked up by the staff, part of the crew again returned to the first site. In Plot FI 96 our collection of Early Sumerian objects was again increased, but no burials or particularly striking finds occurred.

In Plots DE 38, 39, the remains of the upper occupational level were now removed except for the western half of DE 38, and the excavation was carried down to the base of the next architectural level, about 2.70 metres below the surface [Plate III, 2]. We were prepared to find a culture change; but we watched in vain. There was no traceable change of pot forms, or other archaeological features between the uppermost remains and those found in the floor of the second main level. But we found now no more cuneiform tablets. Extensive excavations would show whether tablets are associated with all sublayers of the archaic Fara stratum (II). The lowermost tablet found during our test occurred at 1.30 metres in Plot HI 48. Thus we are certain that all our tablets belong to a late phase of the Early Sumerian period.

There was a well built baked brick foundation on the second level of Plot DE 39. Its base marked the bottom of the second excavation phase

in this test site. Perhaps the most significant though humble find in the layer under consideration was a potsherd, a polychrome fragment of the Jemdet Nasr period, occurring at 2.0 metres of depth. It was the "herald" preparing us for the situation which we were to find about 3.0 metres below.

At this point of the excavation Plot HI 48 was started in order to test the southern section of the main elevation. Soon the adjoining halves of Plots HI 47 and HI 58 were added [Plate IV, 1], because the test spot proved to be extremely fertile as to cuneiform records and all other types of objects of the Early Sumerian period. In addition, our information as to the burial methods of this time was increased by the finding of several coffin burials together with mat burials, a fact which had been noticed already by our predecessor Dr. Andrae.

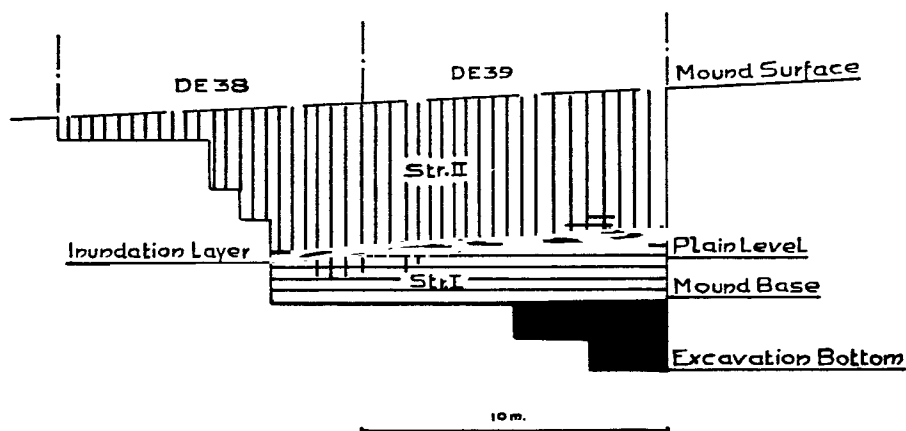
At the same time the clearing of Pit I in Plots FG 43 continued. There was quite an excitement when, at an average depth of 4.5-5.0 metres, skeletons appeared. Altogether eight burials were here discovered. The story of this pit requires a special chapter and it will be told in reference to Fara III the last stratum of the mound, the existence of which was determined in this very construction.

The rest of the absorbingly interesting work of making a miniature section of the large tell and of interpreting its stratifications took place in Plots DE 38, 39. Steadily the excavation proceeded. By now, the wares of the Early Sumerians of Fara had become old acquaintances of ours. At a depth of three and four meters our principal guide vessel, a rather unattractive bowl in form of an inverted truncated cone, still occurred about as frequently as below the surface. The same was true for other vessels, such as a pitcher with spout, and other series of objects. Gradually however, painted potsherds increased. A second polychrome sherd was at 2.90 to 3.10 metres of depth and below four metres painted sherds became rather frequent.

Now we encountered a situation which to us was the most dramatic phase of the test [Plate IV, 2]. Fluctuating on a level between 4 and 5 metres the soil turned almost sterile. Yellow dirt, a mixture of clay and sand, appeared everywhere. Potsherds and particles of ashes, the "last straws" of the archaeologist, became rare. According to the tell cross-section we were close to the level of the plain and the dirt had very much the appearance of virgin soil. We must admit we were disappointed for one of our principal aims was the determination of the assumed "painted pottery" stratum, which would prove the high antiquity of Fara and check to a certain extent the legendary history of the site. The scattered painted sherds found above the sterile layer were not yet quite frequent enough to let us speak of a definite painted pottery stratum. As things were, most laborers were taken to the other test plots and two small groups only were left in

EXCAVATIONS AT FARA

DE 38, 39, in order to make sure that we had actually struck the mound base. Admittedly we had little hope to find culture remains below the yellow dirt. However, as the two soundings proceeded, here and there a potsherd appeared, keeping our hope alive. Then, odd as it sounds, we made the most significant find of the test; an ordinary patch of charcoal and ashes about 60 centimeters below the top of the clay and sand layer. It was clear at once that we had struck a definite level of human inhabitation. The crew was virtually "hurled" back into the plots. Everywhere we encountered the same situation: below the layer of definitely alluvial soil, dark colored culture refuse appeared, and imbedded in this culture dirt we found the first rather complete polychrome vessel *in situ*. We had struck



the Jemdet Nasr stratum of Fara. Many more vessels of new and very attractive form emerged from the extremely fertile culture deposit of this period, together with stone vessel types and numerous other objects which were different or lacking in the upper strata of the tell. At last we had found the "culture break" which we had expected above; but we must state that it was not complete. On the same level with the attractive Fara I vessels, we found rows of single and inverted bowls of the rather ugly Fara II (Early Sumerian) type and quite a number of sherds which we were not able to distinguish from those fragments above the inundation layer. In addition we found very archaic seal cylinders and stamp seals of scaraboid shape in the same layer. In the description of the individual series' of objects and in the final chapter of this report we shall refer again to these important points.

The test approached its completion. A few valuable burials of the painted pottery stratum were uncovered. Some decorated two color sherds

and certain pot forms appeared which may suggest the presence of a still earlier deposit of the Painted Pottery Age at Fara, namely the al'Ubaid. Again, these pot forms and rather simple geometrical decorations may prove to occur during both periods. We struck virgin soil at a depth of 6.50 to 6.75 metres below the mound surface, and .90 to 1.55 below the level of the present plain. Experience had made us cautious. Thus we sounded the totally sterile clayey dirt to a depth of 9.50, three metres below the base of the culture soil at that particular spot. But there was no more charcoal, no more hope.

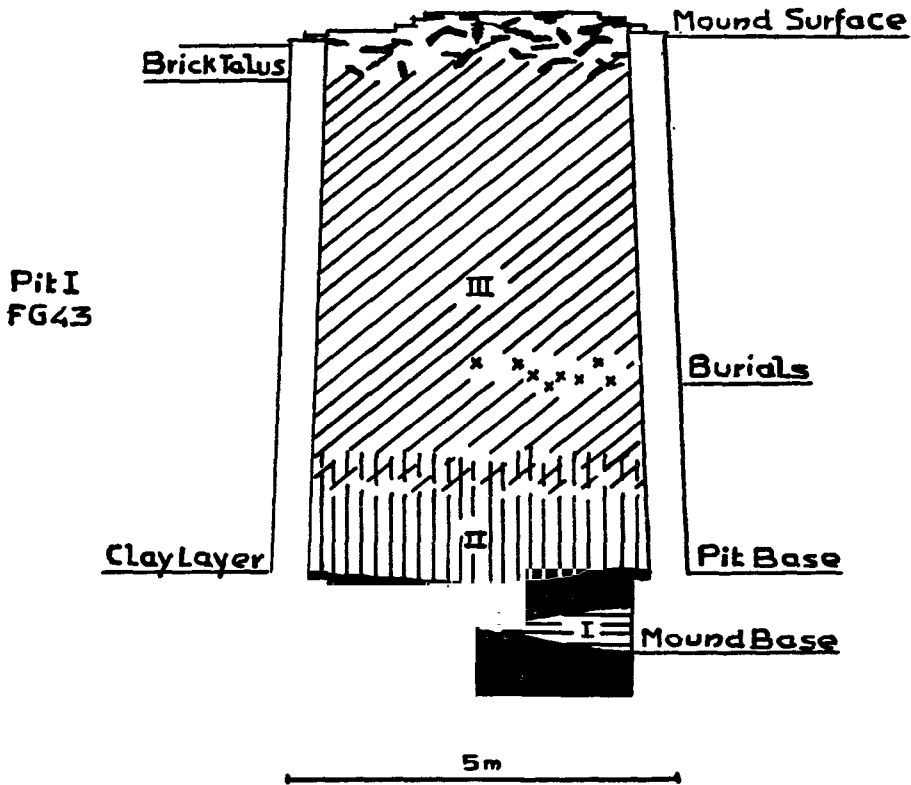
FARA III: THE PERIOD OF THE THIRD DYNASTY OF UR

It sounds impertinent if we state that the story of Stratum III has been told to us, so far, by the trash that has accumulated in a storage pit of an earlier period; but we shall present the evidence and let the reader judge.

We mentioned above that we struck, in Plot FG 43, a well-built circular construction of baked bricks, that looked like an exaggerated well [Plates III, I and V]. At first it was a matter of conscientiousness rather than enthusiasm when we decided to clear the brick shaft that might end somewhere in ground water. But after a time the situation became extremely interesting. Slowly the inner wall front with its pleasing pattern of horizontal and oblique brick courses emerged as the excavation proceeded. Days passed without giving us any particular finds or information; but our curiosity was then already roused by the fact that the monotonously uniform and frequent vessel types uncovered in the other test squares were represented by few and doubtful sherds only. Instead, certain unknown spouts and, further, bowls with an elaborated rim appeared which resembled fragments frequent on the surface of Abu Hatab, seven kilometres from Fara. The first clue was given to us, and our working theory during this stage was that the construction, built of rather unusual bricks, belonged to the "Abu Hatab period." Abu Hatab had previously been found to be more recent than Fara. Then, events came fast. At an average depth of 4.50 metres a series of burials, eight in all, appeared [Plate VI, 1]. There were skeletons of men, women, and children that had been buried in the impressive setting of the huge brick cylinder. We thought we had found the purpose of this puzzling construction, namely that of a communal mortuary cist. It was self-evident, however, that the final proof would not be found until the base was struck. The rather well preserved though disorderly disposed of skeletons were recorded and removed with much care. Now the improvised stairway leading down to the burial layer was cut off to get every information from the cist filling, and men and dump dirt were from then on transported by means of a derrick.

While the skeletons were taken out we made an interesting find, namely an attractive boat-shaped vessel, which, of course, in our irreverent mound

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idiom was called "The Ark" [Plate VII, 1]. The "Abu Hatab type" of bowl [Plate VII, 2] continued to appear beside and below the skeletons thus indicating the relatively late period of the burials. But the second and most significant criterion for the chronological definition of the pit filling, of the burials, and as we shall see, of an entire postulated mound stratum, was the discovery of a complete, though broken, and a fragmentary cuneiform tablet, .20 metre above the skeletons [Plate VIII, 2]. According to our Assyriologist, Dr. Kramer, there is no doubt about the later character of these tablets, as compared with the archaic tablets of Fara. The two tablets under consideration belong to the period of the Third Dynasty of Ur, that is, 24th to 23rd century, to be exact, "The year when GIMIL-SIN became king" as one of the tablets states. All the other cuneiform records uncovered during our test belong to the Early Sumerian period (about 29th to 27th century).

The third criterion was given to us in form of several attractive pottery figurines [Plate IX] of a type which had not yet appeared during the test. In Legrain's valuable publication, *Terracottas from Nippur*, we found no definite parallels to our figurines; but the character of the latter suggests a period later than that of the Early Sumerians.

The fourth significant find was, finally, a seal cylinder impression [Plate VIII, 3], showing a seated deity with adorant (?), a symbolism, according to Dr. Legrain, not occurring on seals of the Early Sumerians.

So far the late character of the pit filling was proved beyond doubt. Now the critical point of the excavation had arrived. The questions were: what kind of remains are associated with the pit base, and how far is the latter below the burials? We dug down. At 5.20 below the orifice, the last pottery figurine appeared. Then the pot forms of the latter period faded away. The last typical rim sherds of Fara III occurred between 5.50 and 6.0, and were displaced from this point down by our omnipresent Early Sumerian pots. To make the contrast complete, a seal cylinder with a Gilgamesh pattern of the Early Sumerian period appeared at 6.20. The Fara II remains extended to the very base of the brick shaft and filled a dry refuse stratum containing floral specimen such as pieces of wood, seeds of dates (!) reeds and the like. Thus two of our theories exploded and we found facts instead: our impressive "Tower of Silence" had turned into what appeared to be a granary or similar storage construction of the Early Sumerian (Fara II) period and it was secondarily only used as a communal burial chamber by later settlers.

This at once raises the question: where then is the stratum of Fara III, the town of "Haladda, Patesi of Sukurru," the site of the Third Dynasty of Ur? In none of the test squares did we find Fara III remains. All burials uncovered directly below the surfaces of the plots belong to Fara II. The original top of the Early Sumerian "granary" was actually above the present mound surface.

Thus the only archaeological clue for the presence of Stratum III is the filling of the brick shaft, while the philological evidence given by our two Fara III tablets is supplemented by the inscription found by Koldewey (*Mit. 16, D.O.G.* p. 13). Here are our archaeological considerations: We do not believe that the numerous pot fragments contained in five to six metres of pit filling have been carried to this point from a distant site. This would seem absurd. The find condition of the tablets, the seal impression and the fragmentary figurines also suggest definitely that these objects had been discarded by persons living close by. We have no doubt that the Fara III town was considerably smaller than the flourishing and long inhabited settlement of Period II. The focus of the later town was perhaps near the outskirts of the extensive site, and individual buildings only extended to a point close to Test Plot FG 43 and the "granary." At the same time we know that a considerable denudation of the tell has taken place during the millenia following the final destruction of the site, an event which may have coincided with the catastrophic end of the Third Dynasty of Ur, brought about by an Elamite invasion. At any rate, there is not the least archaeological clue

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for the presence of a culture stratum succeeding Fara III, which we identified with the period of the last Ur dynasty, and, as to philological criteria, in later records the "town of Uto Napishtim" has become a legendary site.

THE FINDS OF STRATUM III

Tablets and Seals:

All our objects of this period were found in the "granary" of Stratum II. Our seal impression, to be sure, does not have the elaborate pattern of Gimil Sin's "portrait cylinder" shown by Legrain (*Culture of the Babylonians*, Plate XVIII), but its similarity to some of the sealing patterns of this period is striking.

The Pottery:

The pottery is always a faithful guide of the archaeologist. In the case under consideration, a relatively inconspicuous elaboration of the bowl rims gave the clue as to the chronological difference between Stratum II and Stratum III ceramics. The Fara III bowl [Plate VII, 2] has an offset rim which forms a definite "neck" while the Fara II bowl rim is always plain and straight. A certain bell-shaped spout with a thin perforation, and a colander spout are also characteristic for the later period. The attractive boat-shaped vessel [Plate VIII, 1] is a unique specimen and can therefore not be used as a guide object.

Figurines:

The delightful pottery figurines of "plaques" pictured in Plate IX will prove to be extremely valuable, after they have been studied and compared with other material. There are elaborately dressed and ornamented women with paraphernalia of divinity or royalty. A turbaned man is decorated with a broad necklace. Again there is a female (?) head with elaborate head-dress and the well modeled nude body of a woman. Some attractive animal effigies, a bull and dogs or sheep conclude the series.

Miscellaneous:

Except for a problematical bifurcated copper object and a part of an axe or adze of the same material, the remaining finds are not particularly striking. The scarceness of stone objects contrasting with the fertility of the lower strata may be accidental.

The Communal Burial:

A few words have to be said about the communal burial [Plates VI, 1 and VIII, 1]. The refuse had risen to a height of about 2.50 metres above the base of the original "granary" when it turned into a cist by the disposal of eight persons. They were all buried at the same time or almost so, as proven in nearly every case by the interlocking of their bones and the lack

of definitely disturbed burials. Nearly all skeletons gave the impression of hurried and unsympathetic disposals. Some were spread out on top of each other. A child was lying on its face. There was fight and again utter resignation expressed by the positions of some bodies. No mortuary vessels filled with food and drink for the life beyond had been given to them. There was not a single ornament. A few mullers only were close to some skeletons. It seems to us that these persons were either of an inferior social rank, or they had died during an epidemic, or similar catastrophe. In the latter case survivors other than members of their families may have gotten rid of their remains. The first consideration however, seems to be more plausible. As a matter of fact, if we had found an especially well equipped burial close to these skeletons or below them we would not have hesitated to suggest a sacrificial character for the communal disposal.

FARA II: THE PERIOD OF THE EARLY SUMERIANS

The great extent and the great depth of the Fara II deposit, in addition to the extreme fertility, proves that this period saw the climax of the mound's life. Though we may assume that the site of the settlement fluctuated during its long inhabitation, as a rule it must have been large and wealthy. Wheresoever our test squares opened the surface they showed fertile culture dirt of Fara II, and the extraordinary depth of the deposits was determined in Plots DE 38, 39. Our experiences in this test site and in the other plots have been told above. We may therefore at once consider the contents of the stratum.

THE FINDS OF STRATUM II

Cuneiform Tablets:

Altogether eighty-five valuable Fara tablets of the archaic type are in our collection; some of these are shown in Plate XII. According to Dr. Kramer's carefully made catalogue and commentary, nearly all are inventory records, one only is probably a school text. The inventory tablets mention various kinds of grain and flour, bread, several varieties of beer, skins, various woods, domestic animals such as dogs (?), lambs, sheep, oxen and the like. Servants are mentioned, further, official titles, such as "maker of good beer (?)," "dirt shoveller (?)," scribe, porter, and the like. The inventory tablets, according to Dr. Kramer, are records of objects given to or placed in the charge of certain individuals named. Nearly all tablets are bi-convex, square with round corners, or even circular. Slight variations occur. In our collection are tablets which certainly belong to the smallest records of this kind found so far. In all, only three tablets are baked, due perhaps to accidental firing.

The find conditions of our Fara II tablets are interesting. So far none occurred below 1.30 metres. A series of such records occurred in a drainage pipe, where they had been discarded [Plate X, 1]. This pipe reached almost to the very surface and above the floor of the uppermost occupational level. Thus we know that the original owners of the records lived in buildings later even than the last architectural remains traceable at this spot. This means that here, as at other points of the mound, considerable denudation has taken place.

The Burials:

The same consideration concerns also, to a certain extent, the numerous burials found close to the mound surface. Far the greater part of the thirty-seven graves, uncovered in our few test plots, were above a depth of two metres and many were only a few decimetres below the surface. However, the occurrence of an unproportionally great number of burials close to the present surface cannot be explained solely by the denudation of the site. We believe with the former German excavators that a large portion of the tell has been used as a necropolis. During the latest phase of Period II the Fara settlement may have covered considerably less ground than during its climax, and the dead may have been disposed of outside the later Period II town but still inside the former city limits. We have little doubt that during all periods the dead were also buried within the buildings of the living, but the density of the uppermost Fara graves suggest a burial ground rather than individual room burials.

A few more words have to be said about the graves proper: In the same manner as our predecessors we were puzzled somewhat by the occurrence of two kinds of disposals, plain mat burials [Plate X, 2] and coffin burials [Plate XI, 1]. Both categories of graves were supplied about equally as far as our evidence goes with the same mortuary gifts of Period II. Our only explanation for the coffin burials is that they are graves of persons of different social status.

As far as traceable, the legs of all skeletons were more or less contracted. Most bodies had a lateral position; but no *kiible*, that is, orientation towards a sacred or traditional direction, was noticed. Most of the burials had been generously supplied with vessels, such as bowls, cups, pitchers, and now and then with a stone bowl. Strings of beads were in several cases still clinging to the upper vertebrae and the mandible. The wealth of mortuary pottery made it easy for us to date the burials as to their period. In most cases we obtained our full archaeological information; but the extremely bad preservation of the bones made them hopeless for further anthropological studies. The pit burials of Period III form an exception. Several fairly good skulls and long bones of this series were preserved.

Architecture:

As to the architecture of Stratum I, the limitations of our test kept us from uncovering complete ground plans of buildings. The forthcoming publication of the former work of Koldewey, Andrae and others at Tell Fara, will give us information about this point. Far the greatest part of the building sections excavated by us were built of straw-tempered, sun-dried bricks, the shapes of which, as far as traceable were plano-convex. Due to time, climate, and to a certain extent to inferior construction, the mud brick walls had suffered badly. It was extremely difficult, at times, to trace their contours in the crumpled down debris of the same matter.

However, we have explained above that the well constructed "granary" must be attributed to Fara II, and in Plot DE 39, another baked brick construction of this period appeared at an average depth of 2.50 metres. It was the well-built foundation of a mud brick wall or the remainder of an all-baked brick structure, secondarily used as a foundation. The relative difference in depth between the "granary" and this wall is also parallel by the difference of their building units. The bricks of the wall have different dimensions, and they are more pronounced plano-convex. Below the level of the brick foundation insignificant mud wall fragments only occurred.

Glyptic:

We now turn to the most attractive series of our finds, the seals and seal impressions. Plate XII, 1 shows one of our Fara II Sumerians. The beautifully modeled face is clean shaven. A skull cap covers the shaven (?) head. A long robe with lengthwise seam, falls from the chest to a point a little above the delicately wrought knuckles. Our Sumerian may be a part of a sacrificial scene. On his left arm he carries a young gazelle, while with his right hand he grasps perhaps the hand of another person. This figure is a fine example of the Early Sumerian stone cutters art. It is part of a seal cylinder impression on a dark gray clay label 39 millimetres long.

The second example [Plate XIII, 1], a standing bull from a well known Gilgamesh and Ea-bani scene, is artistically still more perfect. Gilgamesh, the "Sumerian Heracles," is probably grasping the bull at his neck and tail and the bull roars. The tree fragment reaching into the section of the pattern before the bull's throat, may symbolize a forest in which the conflict took place.

Another label also shows a Gilgamesh pattern and a fragmentary cuneiform legend meaning "the scribe" while his name is missing. We add further some samples of Fara II seal cylinders and the impression of No. F-665. Our glyptical finds gave us one of the most significant clues as to certain sub-phases of Period II, and as to the relations of the Early Sumerians with their predecessors. We shall refer to these points in the chapter on Fara I.

Figurines:

There is no difference whatsoever between the funny little pottery sheep from Stratum II [Plate XIV, 1] and the sheep effigies of the Mesopotamian colonies in Asia Minor. But, after all, the shape of the fat-tail sheep suggests this conventionalization. Two more animal figurines [Plate XIV, 2 and 3] may represent a pig, and a turtle. We found further some attractive effigy pendants of stone. Human effigies may be present, but we uncovered only doubtful and crude specimens.

The Pottery:

A student of ceramics cannot get enthusiastic over the rather unattractive and crude pots of the Early Sumerians. There are only a few unique or infrequent vessels of pleasing form; but they cannot count as "guide fossils" of Stratum II.

The typical pots of this period are plain bowls in form of inverted truncated cones [Plate XIV, 4, 5], short necked cups with bi-conoid bodies and a flat disk base [Plate XV, 1], and short necked pitchers with oblong bodies and convex (!) bases [Plate XV, 2]. A more attractive variety of pitcher with overlapping rim, sharp shoulder and ring bottom is shown on Plate XV, 3 touched by the fingers of a skeleton. An odd shaped vessel with elliptical cross-section, a knob handle and only one or two small perforations is also frequent. There seems to be a pellet of some material in one or two specimens. Therefore we called these vessels "rattles" for the time being [Plate XVI, 1].

There are, further, vase-shaped pots, lopsided as a rule, such as shown in Plate XVI, 2, 3. The "hourglass-shaped" pots [Plate XVII, 3] might have been used as potstands, if one considers the long half as top part, or as plates with hollow bases if one prefers to turn the shallow, bowl-shaped half upward. Only a few specimens of this type occurred. There is further a pitcher with bi-lobed orifice and a perforation through the center of the neck. In our mound idiom it is called the "nursing bottle" because one of them lay in front of the face of a child skeleton. The very appropriate and quite attractive canteen in Plate XVII, 1 has a laterally compressed body and two cord handles. This vessel type was noticed below 3 metres only; but we cannot definitely judge from our limited test area. The most pleasing vessel, finally, a fish effigy [Plate XVII, 2, 4], stuck right out of the mound surface about 15 metres east of FG 43. However we do not hesitate to attribute it to the late phase of Period II judging by the pot sherds that fill the find area. The "fish" is quite naturalistically modeled. Its fins are sculptured or incised. The narrow aperture forms the mouth above which a small perforation is present.

Except for the doubtful fish vessel all other pots are wheelmade in the same way as the ceramics of the succeeding and preceding periods. The usual color is grayish brown.

Stone Vessels:

The attractive alabaster cup or bowl illustrated in Plate XVIII, 2 was close to the heads of a male and a female skeleton lying in one grave. Stone vessels seem to have been much valued by the Early Sumerians. Complete vessels are rather scarce. Now and then one stone pot is found in a grave that contains a great number of pottery vessels. Stone vessel fragments however are quite frequent. Some show perforations along the fracture, indicating that the particular vessels had been repaired by their owners. None of the "common type" pottery vessels show repairing holes. To be sure, it took considerably more work to grind out a stone vessel by means of the convex discoid stone grinders used for this purpose, as compared with the making of a clay pot. Besides that, every bit of stone had to be imported from more or less distant localities.

We illustrate two more small stone jars [Plate XVIII, 1, 3] in addition to an interesting pigment cup with two depressions [Plate XIX, 1, 2]. Personally we found no traces of paint in this particular vessel but its purpose was determined by the German excavators, who found identical vessels with remains of paints.

Objects of Shells:

We did find "paint cups" of another type, namely natural shells [Plate XIX, 3], containing traces of purple, red, orange or yellow, black, and green pigments. But these paint cups have rather the character of portable little vanity boxes (without lids) than of stationary pigment containers. Such shells accompanied several skeletons. A (doubtful) male had a shell cup with white paint, and a female was supplied with a shell containing light yellow pigment. We assume with Koldewey and Andrae that the paint cups of stone and particularly those of shell were used for body or especially for facial decoration.

Ornaments:

In addition to shell pendants and beads of shell great numbers of stone ornaments, such as discoid, tubular, globular beads of Lapis Lazuli, rock crystal, cornelian, smoky quartz, coral, granite, occurred; further similar beads of bone and clay. Perhaps the most attractive ornaments are pendants of rock crystal illustrated in Plate XIX, 4. We took great pains to determine if possible the sequence of those beads still adhering in string sections at the necks of certain skeletons. The upper one of the strings illustrated in Plate XX, 1 is in the original order, while the lower beads are arbitrarily connected. We were somewhat disappointed not to notice any particularly neat arrangement, as to colors or shapes. The owners of these necklaces seem to have paid more attention to the beauty and the material value of the individual beads than to the artistic effect of the whole ornament. A

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necklace of less valuable material, clay, is shown [Plate XXI, 1] *in situ* where it may have been lost or cached away. The biconoid beads had perhaps been dipped in bitumen as suggested by their black exterior coating.

Metal Objects:

Even when Fara ceased to exist as an inhabited site, the Iron Age was still a thing of the distant future. The Fara III town may or may not have known bronze. Chemical analyses of the metal objects will tell us that. Fara II is still almost certainly a Copper Age stratum, judging from the commentaries of other archaeologists who refer to this question. Again the chemist will have the final word. We saved lumps and fragments of assumed copper of all depths, to have them defined as to their contents of tin. Outwardly the bluish green oxide of the curved dagger (?) blade [Plate XX, 2], the long awls [Plate XXI, 2], fish hooks and other objects not illustrated, can either indicate copper or bronze, that is, an alloy of copper with more than 10% of tin.

Stone Objects:

In addition to metal implements and weapons, the settlers of Fara II still used certain flint objects of their neolithic ancestors. We found great numbers of plain chalcedony flakes used as knives, and others with one serrated edge used as saws. In two instances saws were found in their original setting of bitumen. The series of stone objects includes further, the omnipresent mullers and hand grinders, several varieties of weights, polishing stones, and the like.

FARA I: THE PAINTED POTTERY AGE

(JEMDET NASR)

In the chapter on the general excavation we described how we found an alluvial layer at a depth between four and five metres below the mound surface. Koldewey's excavation party noticed apparently the same layer at the tell margin. There need, therefore, be no doubt about the character of the nearly sterile deposit; but we have to leave it to the imagination of the reader, whether "the flood stratum" of Fara accumulated during one or several catastrophic inundations caused by the rising of the sea or the Two Rivers, or both combined with extensive precipitations. The shore of the Persian Gulf was then only sixty miles from Fara while to-day the mouth of the Shatt el Arab is more than two hundred miles away.

One of our most interesting problems is now: Has the rising of the waters completely destroyed towns, men and beasts? Has the culture, existing prior to this event been completely erased at this locality, or, speaking archaeologically, is there an absolute culture break expressed by the

total difference between the remains below and above the alluvial layer? We have to answer "Yes and No," while interpreting our information.

Fara I, the painted pottery stratum, distinct in most respects from Fara II, is definitely situated below the alluvial layer, while only a few objects of this period, namely one stamp seal and some sherds "floated" in the refuse above. In this respect an absolute culture break took place. But our next point is much more significant. It is not only of local importance as a chronological feature. It has direct bearing upon the very acute question as to the earliest history of the Sumerians in Mesopotamia.¹ We firmly believe that the invasion or infiltration of the Early Sumerians (Fara II) into Mesopotamia took place during the Jemdet Nasr period (Fara I). We believe that the Fara I and II peoples were utterly distinct, culturally, linguistically (see Speiser) and perhaps racially. Our archaeological criteria suggest that the Early Sumerians and the Jemdet Nasr people lived side by side or intermingled to a certain extent without adopting each other's culture. As far as our information goes, there are no evolutionary relations between the Jemdet Nasr culture of Fara and that of the Early Sumerians. The Jemdet Nasr culture dies out while the implanted Sumerian culture survives and develops.

At present we have only two striking criteria to support our conclusions. In the find level of the Jemdet Nasr polychrome vessel here shown [Plate XXII], and side by side with the purplish-red slipped vessel of this time we found series' of our typical unattractive Fara II bowls and quite a number of sherds which we were not able to distinguish from the ceramics of Stratum II. Further, not less than five seal cylinders of very archaic type [Plate XXIII, 2, 3, 4] occurred in the Jemdet Nasr stratum and on the very levels with ten incised stamp seals of scaraboid form [Plate XXIII, 8, 9, 10]. We do not hesitate to attribute the stamp seals with their primitive geometric patterns to the indigenes of Stratum I. The uppermost stamp seal, showing an exceedingly conventionalized quadruped(?) in drill technique occurred at 4.60 metres of depth, corresponding, at this point to the top of the alluvial layer. We consider the seal cylinders with incised and drilled conventionalized animals and with rather intricate geometrical designs to be seals of the earliest Sumerians. The uppermost seal cylinder with geometrical pattern occurred at 4 metres of depth, while the later Fara II cylinders and impressions show rather naturalistic animal figures and Gilgamesh—Ea-bani scenes. We are convinced that the continuation of the work at Fara will amplify our information in respect to other categories of objects. We expect the duality of the two features above explained, that is, Jemdet Nasr pottery with Sumerian pots, stamp seals and seal cylinders, to be paralleled by other

¹We may refer at this point to Dr. E. A. Speiser's valuable and scholarly dissertation on *Mesopotamian Origins*.

dual traits, such as two kinds of weapons, architecture and the like. The relations of the two cultures form an exceedingly interesting and important problem.

OTHER FINDS OF STRATUM I

Except for some patches of discolored dirt which may or may not have been wall remains, we found no traces of architecture in the small test area examined; but "pots and pans" vessels and grouped implements of stone stood on a definite floor level where they had been deserted more than five millenia ago. This brings us once more to a question raised in the beginning of this chapter: Have buildings and living beings perished during the inundation period? We must admit, we do not yet know. We found no remains of human beings or animals suggesting an abrupt end. Two skeletons of orderly buried persons, each with a small jar of this period at the head end, were imbedded in the stratum. If more extensive excavations will not uncover remains of human beings or animals that perished during a general catastrophe, we must assume that the population was warned and fled or that the end of the Jemdet Nasr settlement at Fara was not due to the inundation period but approximately coincided with it. To be sure, while uncovering the fertile Stratum I floor level below the alluvial layer we gained the impression that the population had hastily deserted their homes leaving their belongings behind.

The Pottery:

The Jemdet Nasr people of Fara were either more imaginative pot makers than the Early Sumerians or the baked clay vessels were more greatly valued by them. In addition to a variety of pleasing forms, the artist had at his disposition monochrome, bichrome and trichrome decorations of pleasing though rather simple geometrical designs. But we found fragments also of conventionalized animal patterns [Plate XXIV, 4, 5].

Our most striking type vessel of this period is a trichrome or polychrome jar [Plate XXII] found at 5.35 metres. The buff surface is largely covered with a purplish red paint coat. While applying the red paint, certain panels of the original surface were left blank to be bordered and subdivided by black lines into triangles and series of lozenges which were again filled in part with dashes of red paint. Four knobs protruded from the shoulder. Sherds of similar vessels occurred in the same stratum; but there were also pot fragments painted with brown or brown red bands, or geometrical figures or with animal patterns on light buff or brown surfaces.

Vessels obtained in Stratum I include, further, a small pitcher with conical spout and banded decoration [Plate XXIV, 1, 2], a small green colored jar with bi-conoid body [Plate XXIV, 3], a small jar with hemispherical lower body and oblique incisions [Plate XXV, 1], and several very

pleasing "suspension jars," purplish red or light gray brown with four triangular cord handles on the shoulders [Plate XXV, 2]. The latter pot form is identical with vessels attributed to the al 'Ubaid period, supposedly preceding the Jemdet Nasr culture. Certain sherds also occurring in Stratum I resemble al 'Ubaid designs but we have not yet an absolute clue for the presence of a definite al 'Ubaid stratum at Fara. The pitcher shown in Plate XXV, 3 was also found in our lowermost stratum. It is unique, but it resembles the Fara II wares. As to the "common type" bowls found in the Jemdet Nasr layer, the photograph of the Fara II bowls [Plate XIV, 4, 5] illustrates them as well.

Stone Vessels:

Shallow, well wrought plates of rectangular or trapezoid form [Plate XXVI, 1] were only found in the stratum under consideration; but the heavy globular jar with broad discoid rim [Plate XXVI, 2] reminds one of the stone vessel illustrated in the chapter on Fara II.

Miscellaneous Objects of Stone, Pottery, Bone, and Metal:

There is an interesting though problematical diorite object modeled in the form of a six fingered hand [Plate XXVI, 3]. Its socket indicated that it was attached to some device. As a mace head, however, it was not large and heavy enough. Otherwise, mace head fragments of globular(?) or pear shaped (?) specimens occurred in Strata I and II. Fragments of pottery sickles were frequent in the Jemdet Nasr layer. The work in bone is illustrated by a polished bone slab with chisel edge and a neatly incised spindle shaped object [Plate XXVII, 1]. The lance head or short dagger (?) blade [Plate XXVII, 2] shows that the working of copper was well advanced during the earliest Fara period.

The Burials:

We found only two graves attributed to Period I. In both cases a small jar stood close to the skull [Plate XXVII, 3], and Skeleton x-16 lying in the very bottom refuse of the mound deposit, had the most elaborate necklace found during our test. Both skeletons lay on their right side. The legs of one person had hardly been contracted, while those of the second skeleton were flexed as closely as the legs of numerous Fara II skeletons. The continuation of the excavation on a larger scale will doubtless furnish a number of fairly well preserved skulls and other bones of all Fara periods. The physical anthropologist will then be able to tell us whether the people of the Jemdet Nasr period were racially as distinct from the Early Sumerians as they were culturally. He may be able to tell us to what extent racial mixture took place and where the original foci of their racial affinities and diffusions are situated, thus supplementing the work of the archaeologist and the philologist.

EXCAVATIONS AT FARA

SUMMARY

RESULTS, HISTORY, AND LEGEND

While excavating a minimal patch of the extensive Fara mound, we succeeded in getting a reliable miniature cross-section of the great tell's life. Its principal age phases are defined by our culture strata, Fara I, II, and III, corresponding to three broader culture horizons of Mesopotamia, namely the Jemdet Nasr Period, the Early Sumerian Period and the Period of the Third Dynasty of Ur.

In our first chapter we explained the aims of our test, the methods of approach and the general course of the excavation. Then we defined the contents of the mound strata determined during the test and we showed examples of the principal "guide fossils."

It is clear that the pottery was our most faithful and reliable guide. Painted jars define Stratum I, plain bowls, pitchers and cups of characteristic form guide the excavator through the thick Stratum II, while elaborations, such as offset bowl rims and certain spouts characterize Stratum III. Archaeologically next in importance comes our collection of seals and seal impressions, including, at the same time, our artistically most striking finds. There are primitive little "scaraboids" associated with Stratum I in the same manner as extremely archaic seal cylinders which we attribute to the Sumerian newcomers. The seal cylinders of Stratum II continue the early series and climax in the two beautiful figures of our Fara II Sumerian and the "standing bull." In Stratum III, finally, we find the symbolism of the seated deity foreign to the earlier patterns.

Now already other categories of finds, such as our attractive Period III figurines, stone vessels, ornaments and other objects of pottery, stone, shell, and bone, not to forget the remains of human beings and animals, promise to fall in line with pottery and glyptic to form impressive series' illustrating the individual culture phases and their interrelations and linking them up with the Mesopotamian culture foci of their time.

Within the strata of their occurrence, our cuneiform tablets are historically the most significant finds. Stratum I is not yet represented by written records. Judging from the excavators' experiences at the site of Jemdet Nasr and at Warka, for instance, we expect that the forerunners of cuneiform writing, namely pictographic records will also be found in the Jemdet Nasr stratum of Fara. We are extremely curious whether such writing will be found associated with pure Jemdet Nasr remains, with mixed Jemdet Nasr and earliest Sumerian objects, or with pure material of the Sumerian intruders within the stratum of the indigenes. We are convinced that the question as to relations between the earliest Sumerians and the Jemdet Nasr people (presumably Elamites) can largely be solved archaeologically.

Nearly all our cuneiform tablets were found in Stratum II. The find conditions prove that these records belong to the last sub-phase represented by less than two metres out of a total of about 4.50 metres of culture deposit accumulated during this time. In addition, we have the massing of burials in the top layer suggesting extensive secondary use of parts of the site as a necropolis during the final phase of Fara II and we have fairly distinct types of bricks at various depths (Pit I in FG 43, and Wall in DE 39). These facts must be considered while dating the stratum by means of the tablets. In the opinion of our co-worker, Dr. Kramer, the Fara II series of tablets should be dated between the 29th and 27th centuries. The deposit of Stratum II and particularly that phase of the Early Sumerian period overlapping with the Jemdet Nasr period must necessarily be dated considerably earlier than the tablets, thus carrying us far into the fourth millenium. We may not be far wrong if we estimate the duration of Period II from about the middle of the fourth millenium to the beginning of the Sargonide period (about 27th century). The Jemdet Nasr period (I) would thus fall into the first half of the fourth millenium, its final phase overlapping with the beginnings of the Sumerian culture in Mesopotamia and its end coinciding at Fara with an inundation period the deposits of which we found on top of its remains.

As to Fara III, our archaeological criteria for the presence of a stratum of this period were explained above. However, had it not been for Tablets F-973, and F-750, we would not have been able to date Stratum III as accurately as it can be done now. On the other hand our archaeological information about Fara III has a direct bearing upon the question which we have hardly touched as yet, namely the ancient name of the site of Fara, supposedly "Shuruppak." Had we not found a definite clue for the presence of a settlement during the time of the Third Dynasty of Ur, Fara could not be Shuruppak; for a number of records, explained in the commentary of Dr. Kramer, refer to this town as definitely existing during the period under consideration. Further the presence of a Fara III deposit, somewhere on the extensive site checks to a great degree of probability the origin of the significant record found by the German excavators: namely a cuneiform inscription of Haladda, Patesi of Sukkur (Shuruppak). As an additional criterion for the identification of the site we may mention the frequency of the name "Sukkur" in the Fara tablets as a whole, as suggested by our co-worker, Dr. Kramer.

Mythology, even, seems to fall in line. Shuruppak is mentioned as one of the "pre-diluvial cities" of Mesopotamia, and mythology lets the city play an important role in the disaster by considering Shuruppak the home of Ut-Napishtim, the Sumerian Noah. Let us try to interpret the legend rationally and correlate it with our experiences. The tradition means to say that Shuruppak has been inhabited in remote antiquity prior to the memory

EXCAVATIONS AT FARA

of man (namely that of the Sumerians). Our archaeological evidences concerning the Jemdet Nasr stratum, together with the philological considerations showing that the city name is Elamite, prove the high antiquity of the site, and suggest definitely that the occupation of the site reached "beyond the memory of the Sumerians." Further, the Mesopotamian Flood story and, going a step farther, that of the Bible, seems to be based on a very real event or a series of such, as suggested by the existence at Ur, at Kish, and now at Fara, of inundation deposits, which accumulated on top of human inhabitations. There is finally "the Noah story," which may possibly symbolize the survival of the Sumerian culture and the end of the Elamite Jemdet Nasr culture. At Fara, at least, the end of the latter, seems to coincide with an inundation period, though it is not necessarily due to it.

Some of our last considerations are purely "plays with thought." They do not try to make history out of mythology, but they show interesting parallels between the facts which we dug out of our test squares and the Shuruppak legend, referring most probably to our site.



FIGURE 1.—Sandstorm approaching Fara Camp.



FIGURE 2.—A Peaceful Day in Fara Camp.

PLATE I.—SCHMIDT: Excavations at Fara, 1931.



FIGURE 1.—Fara Landscape; Foreground: Fara "Granaries" in the German Excavations.



FIGURE 2.—Plots DE.38, 39. Top Layer with Drain Pipe where Tablets occurred.

PLATE II.—SCHMIDT: Excavations at Fara, 1931.

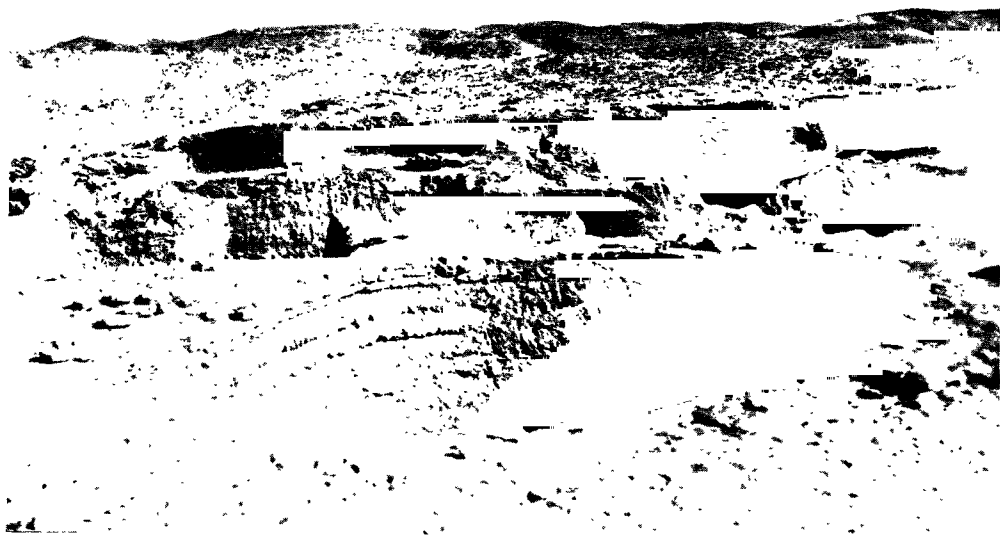


FIGURE 1.—Plots FG 42, 43, showing "Circular Construction."



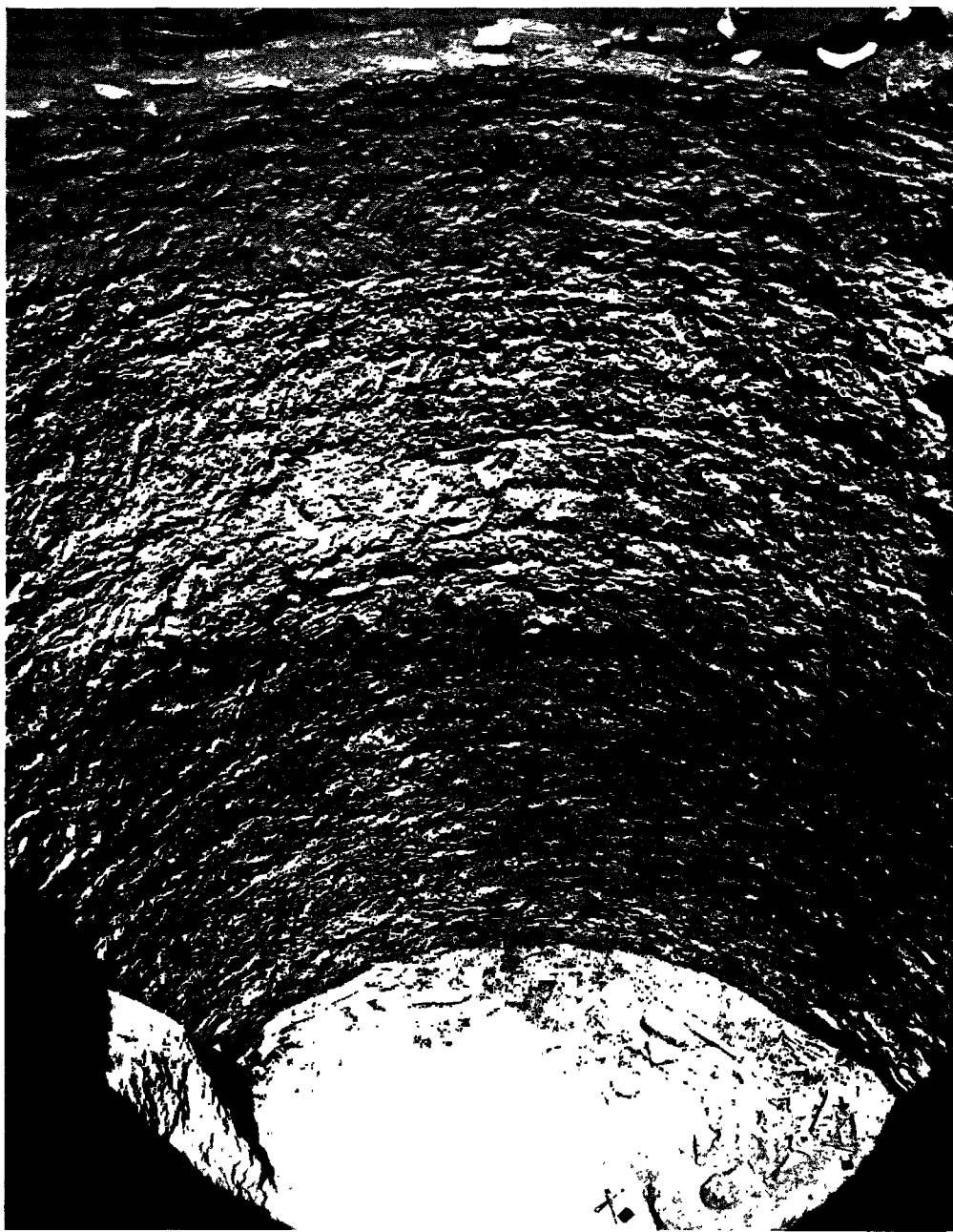
FIGURE 2.—Plots DE 38, 39, Second Level. Dr. Kramer and Sulmen working on Drain Pipes.
PLATE III.—SCHMIDT: Excavations at Fara, 1931.



FIGURE 1.—Plots HI 48, 58 excavated, HI 47 started.



FIGURE 2.—Close to the Top of the "Inundation Layer" in Plots DE 38, 39.



Communal Burial of Fara III in the "Circular Construction."

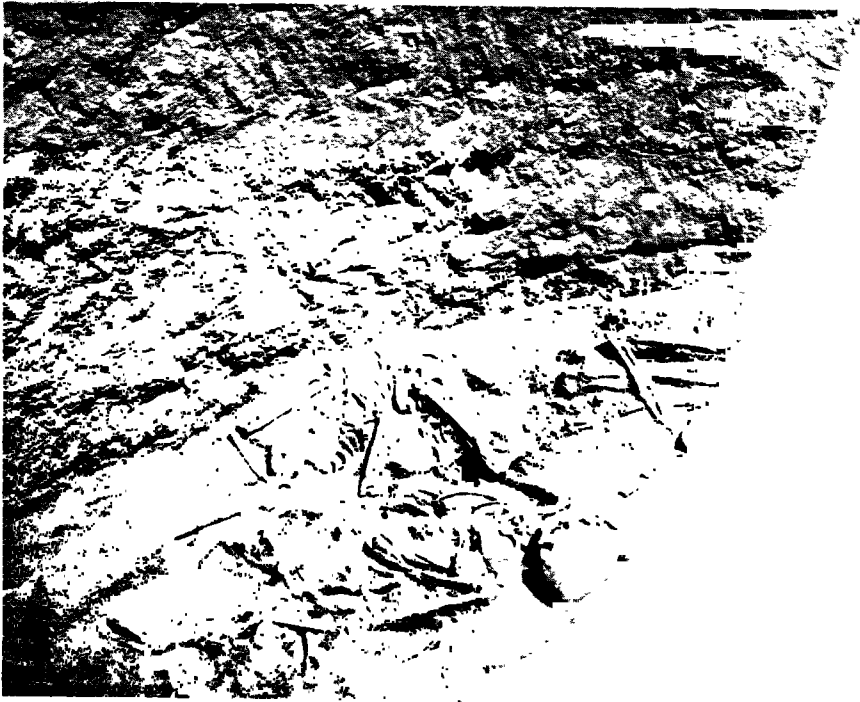


FIGURE 1.--Close-up of Communal Burial.



FIGURE 2.--Skull from Communal Burial.

PLATE VI —SCHMIDT: Excavations at Fara, 1931.



FIGURE 1.—Boat-Shaped Vessel of Period III.

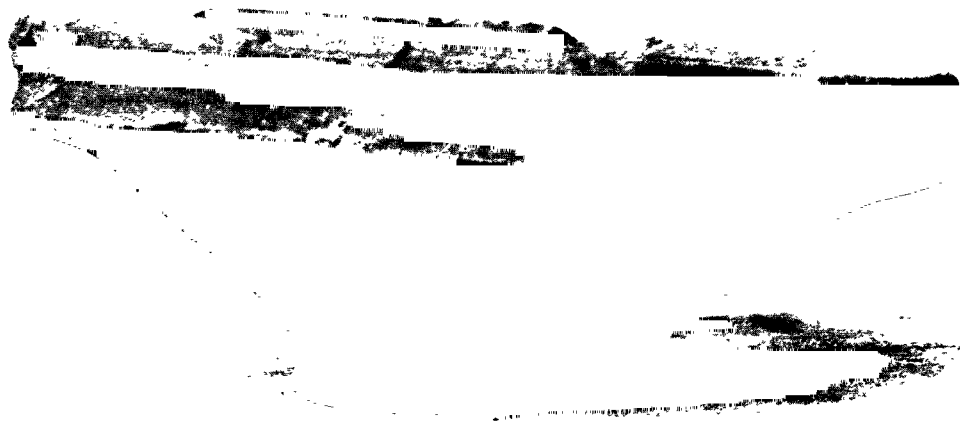


FIGURE 2. Period III Bowl.

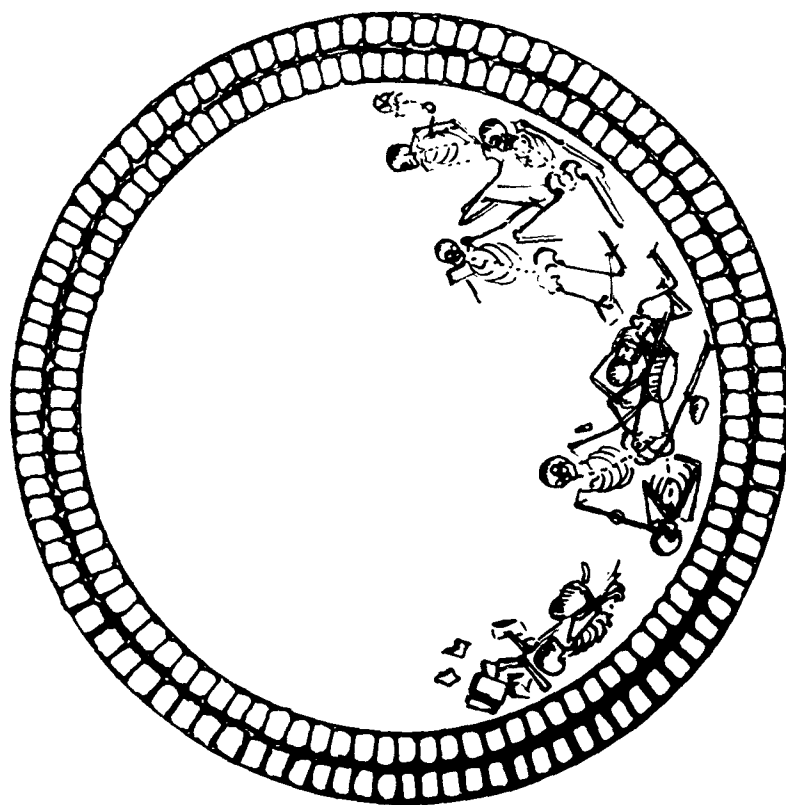


FIGURE 1. Plan of the Communal Burial.

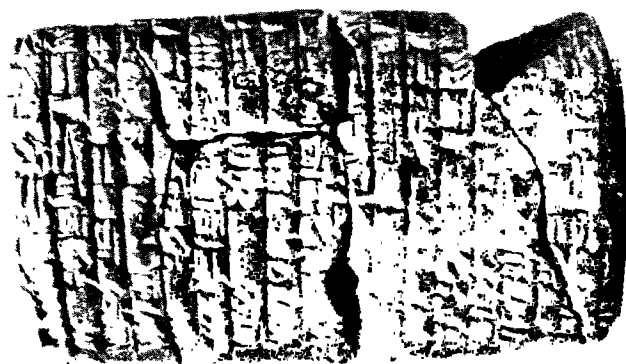


FIGURE 2. Fara III Tablet, dated "Year in which GIMIL-SIN became King."

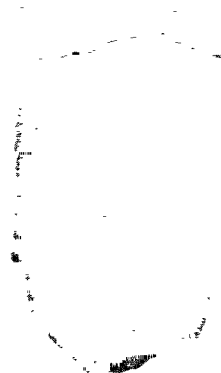
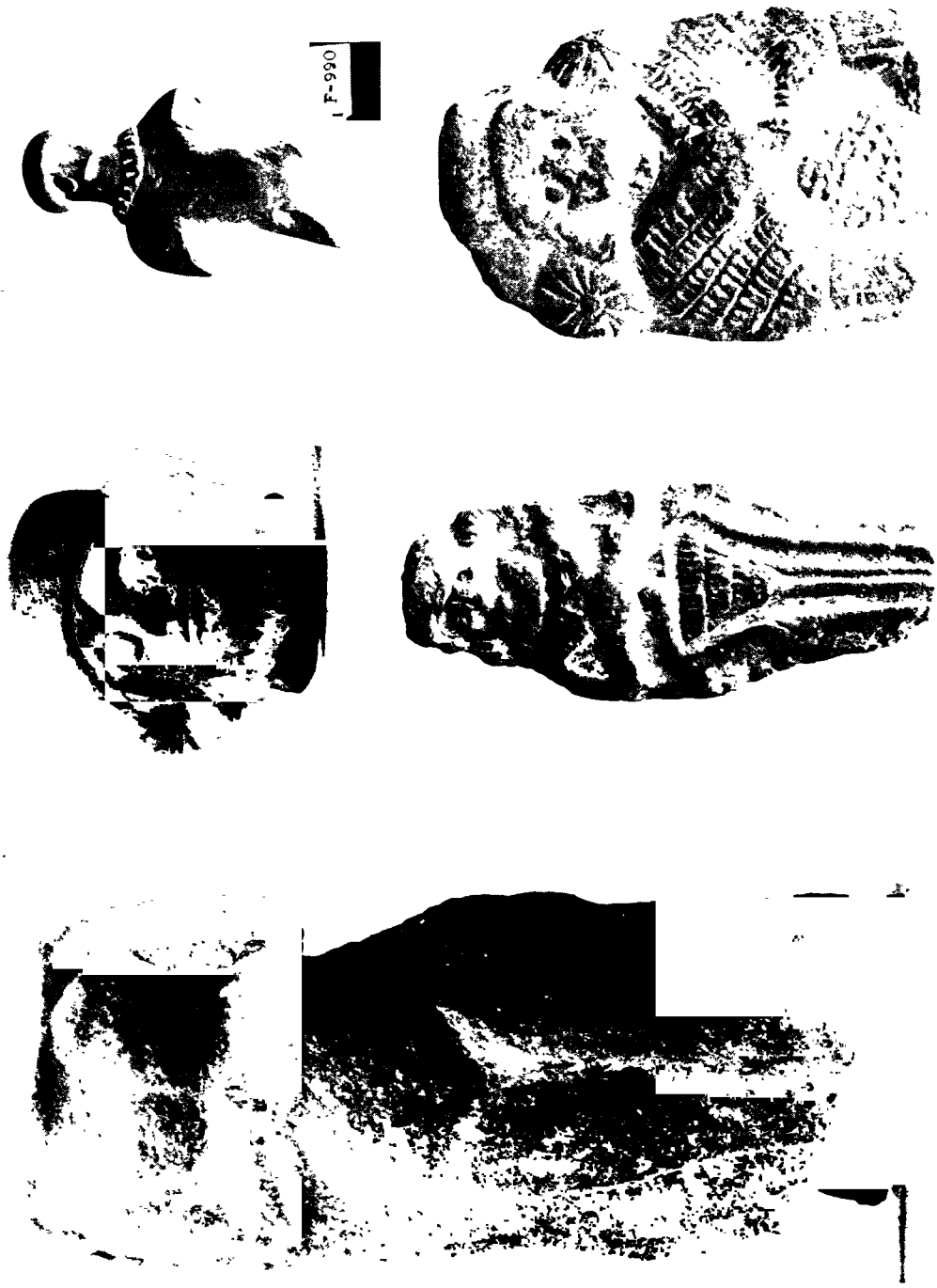


FIGURE 3. Seal Impression with Seated Dicty Motif, Period III.



FIGURES 1 TO 5. —Period III Figurines.



FIGURE 1.—Fara II Tablets *in situ* in a Drain Pipe.



FIGURE 2. Double Burial of a Man and Woman, Fara II.

PLATE X.—SCHMIDT: Excavations at Fara, 1931.



FIGURE 1.—A Coffin Burial of Fara II.



FIGURE 2.—Baked Brick Wall of Lower Fara II Level.

PLATE XL. —SCHMIDT: Excavations at Fara, 1931.

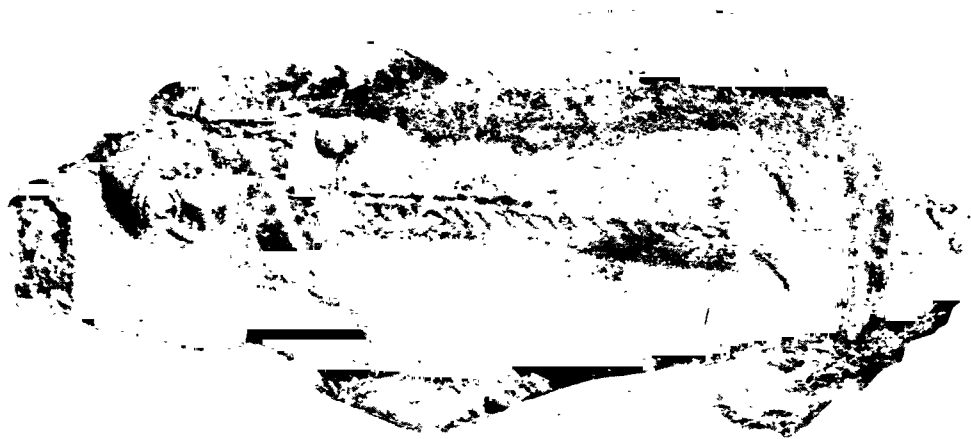
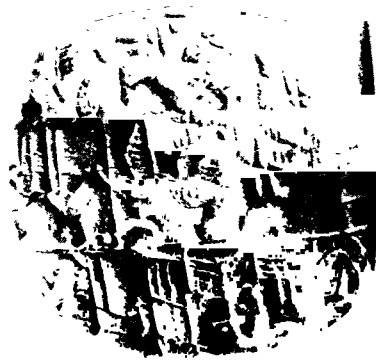
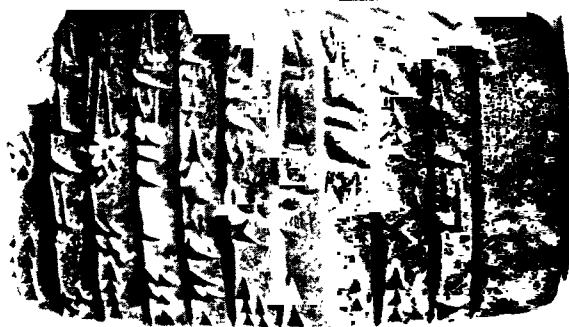


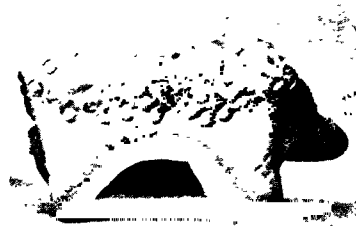
FIGURE 1.—Fara II Seal Impression.
PLATE VII. SCHMIDT: Excavations at Fara, 1931.



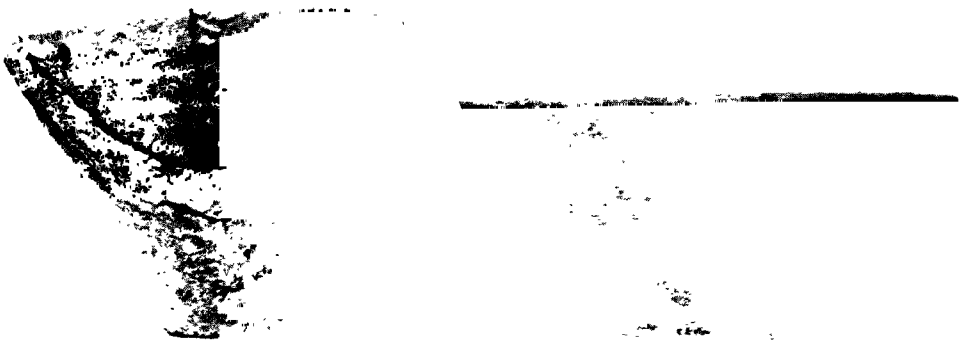
FIGURES 2 to 4.—Fara II Cuneiform Tablets.



FIGURES 1 TO 6.—Fara II Seals and Impressions.



FIGURES 1 to 3.—Fara II Figurines.



FIGURES 4 and 5.—Fara II Pottery.



FIGURES 1 to 3.—Fara II Pottery.

PLATE XV.—SCHMIDT: Excavations at Fara, 1931.

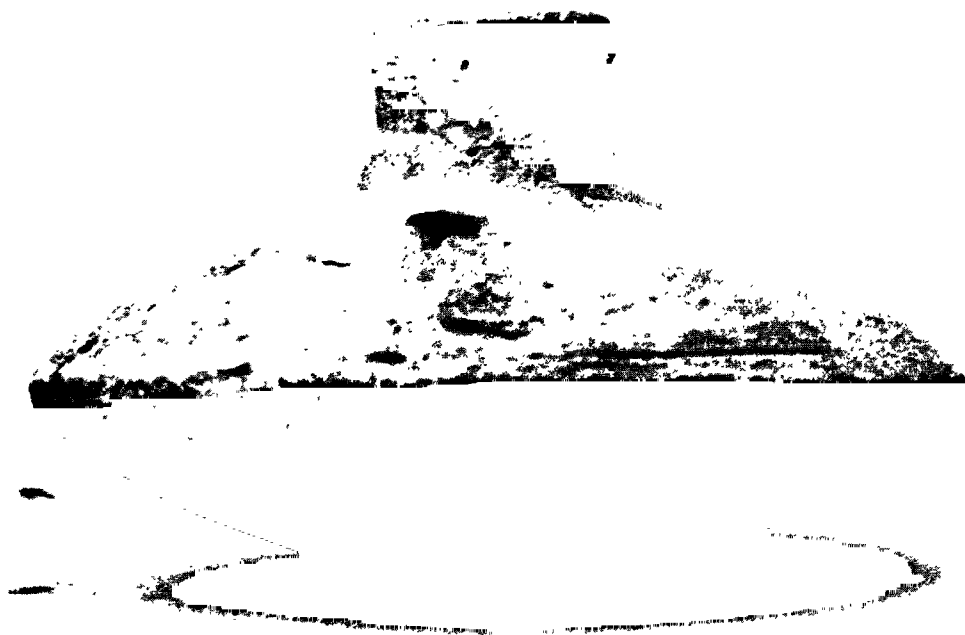
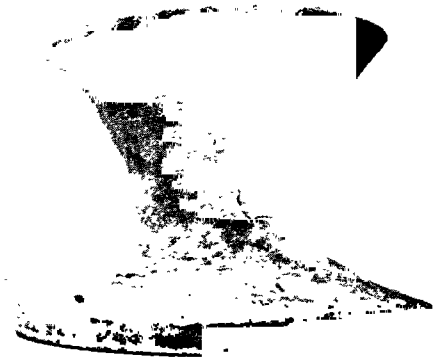


FIGURE 1.—A Fara II "Rattle."



FIGURES 2 and 3.—Vase-shaped Pots of Fara II.

PLATE XVI.—SCHMIDT: Excavations at Fara, 1931.



FIGURES 1 to 4.—Fara II Pottery.



FIGURES 1 to 3 — Fara II Stone Vessels.



FIGURES 1 and 2.--Fara II Stone Pigment Cup.



FIGURE 3.--Fara II Shell Pigment Cups.



FIGURE 4.—Fara II Pendants of Rock Crystal.



FIGURE 1.—Two Strings of Beads from Fara II Skeletons — Upper One in Original Order.



FIGURE 2.—Curved Dagger (?) Blade of Copper, Fara II.



FIGURE 1.—String of Fara II Clay Beads *in situ*.

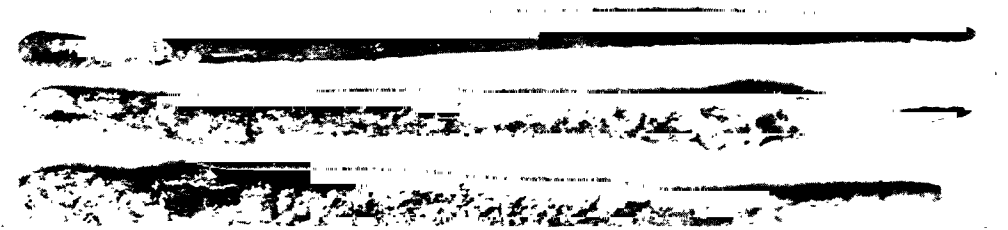


FIGURE 2.—Fara II Copper Awls.

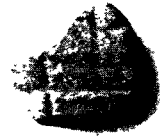


FIGURES 1 and 2. —A Fara I Polychrome Jar.

PLATE XXII —SCHMIDT: Excavations at Fara, 1931.



FIGURE 1.—Work in Stratum I of Plot DE-39.



FIGURES 2 to 7.—Archaic Cylinder Seals and their Impressions.

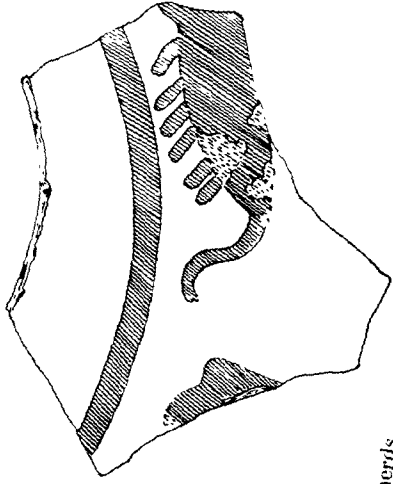
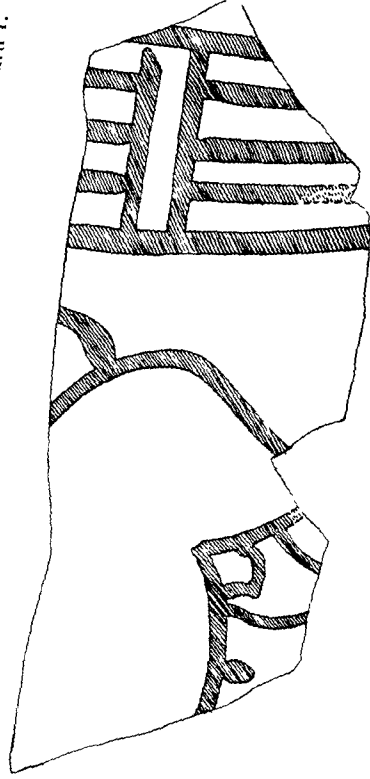
FIGURES 8 to 10.—
"Scaraboid" Stamp
Seals, Fara I.



FIGURES 1 and 2. Small Pitcher with Band Decoration of Fara I.



FIGURE 3. Small Green Jar of Fara I.



FIGURES 4 and 5. Animal Patterns on Fara I Potsherds.
PLATE XXIV. SCHMIDT: Excavations at Fara, 1931.

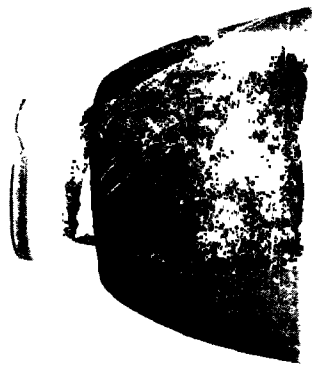


FIGURE 1. Small Fara I Jar with Oblique Incisions.



FIGURE 2.—Fara I Jar with Four Suspension Handles.
PLATE XXV.—SCHMIDT: Excavations at Fara, 1931.



FIGURE 3.—Fara I Pitcher resembling Fara II Ware.

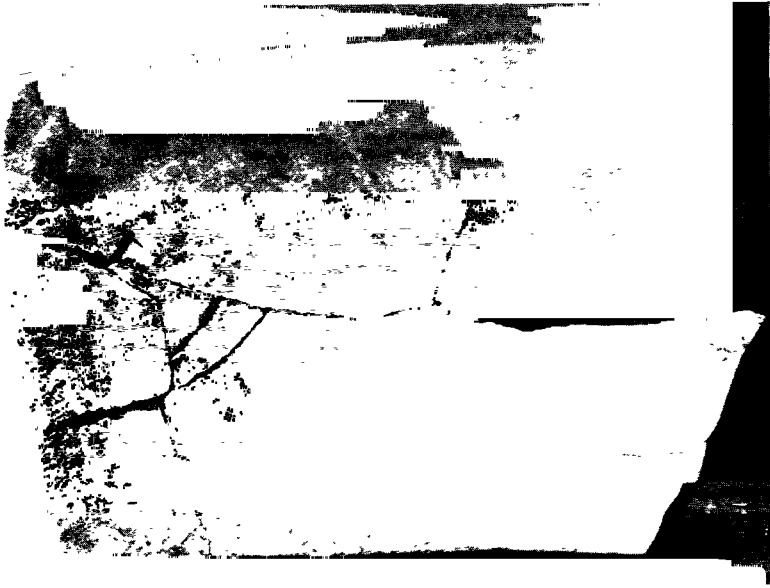


FIGURE 1.—Stone Plate of Fara I.



FIGURE 2. - Globular Stone Jar
from Fara I.



FIGURE 3.—Hand-Shaped Diorite
Object from Fara I.



FIGURE 1.—Bone Objects of Fara I.



FIGURE 2.—Copper Blade of Fara I.

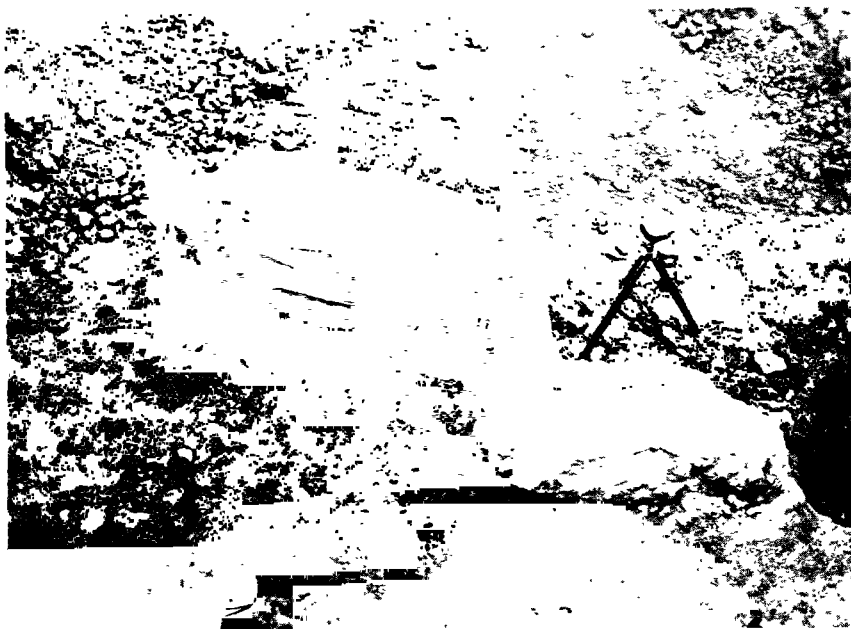
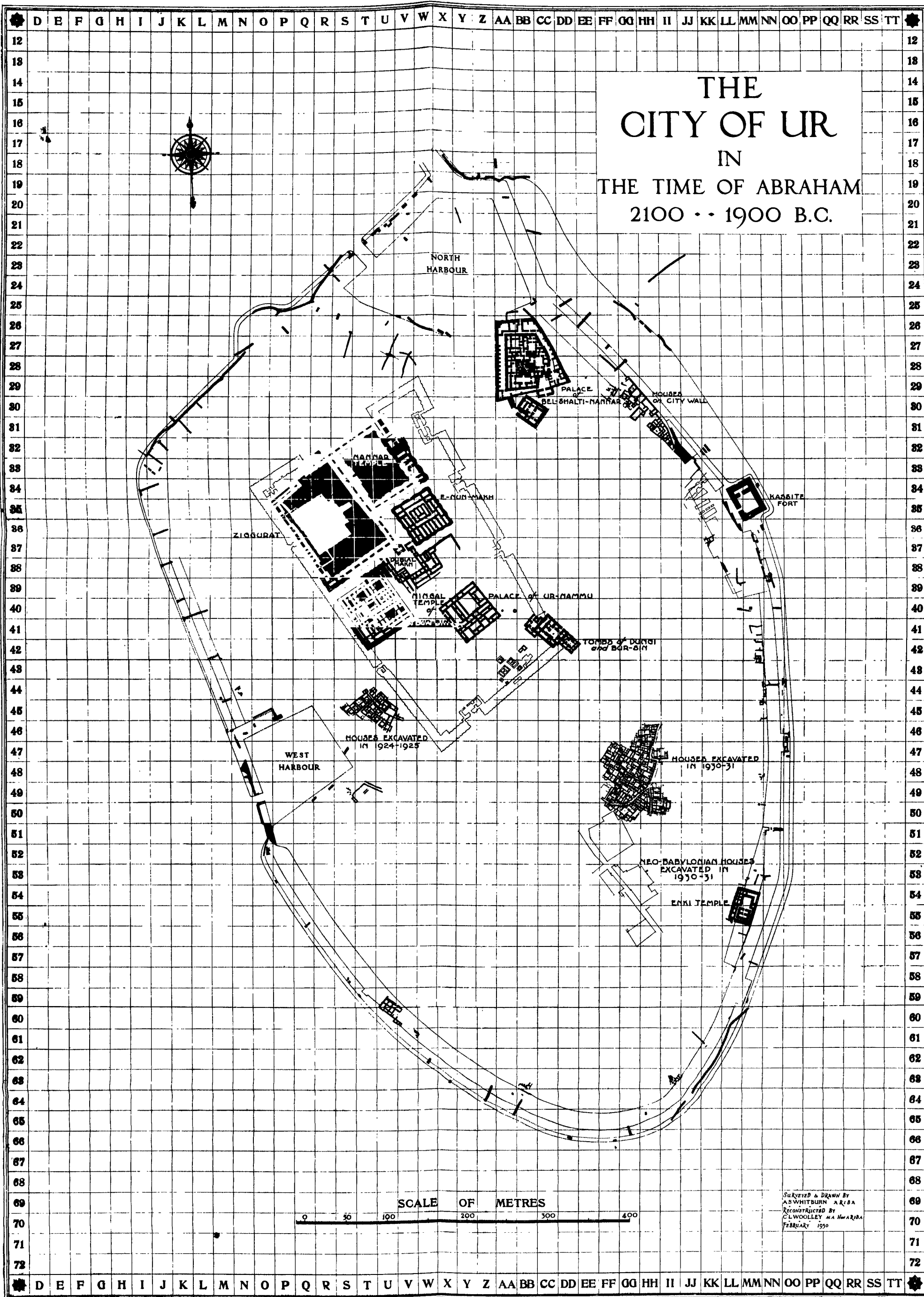


FIGURE 3.—A Fara I Burial.



EXCAVATIONS AT UR, 1930-31

BY C. LEONARD WOOLLEY

THE Joint Expedition of the British Museum and the University Museum started its ninth season at Ur on November 1, 1930, and continued in the field until March 20, 1931; the season was a long one and a larger number of workmen than usual was employed, the average for the first three and a half months being two hundred and eighty and for the remainder of the time two hundred; the amount of actual excavation done was in consequence greater than in any previous year.

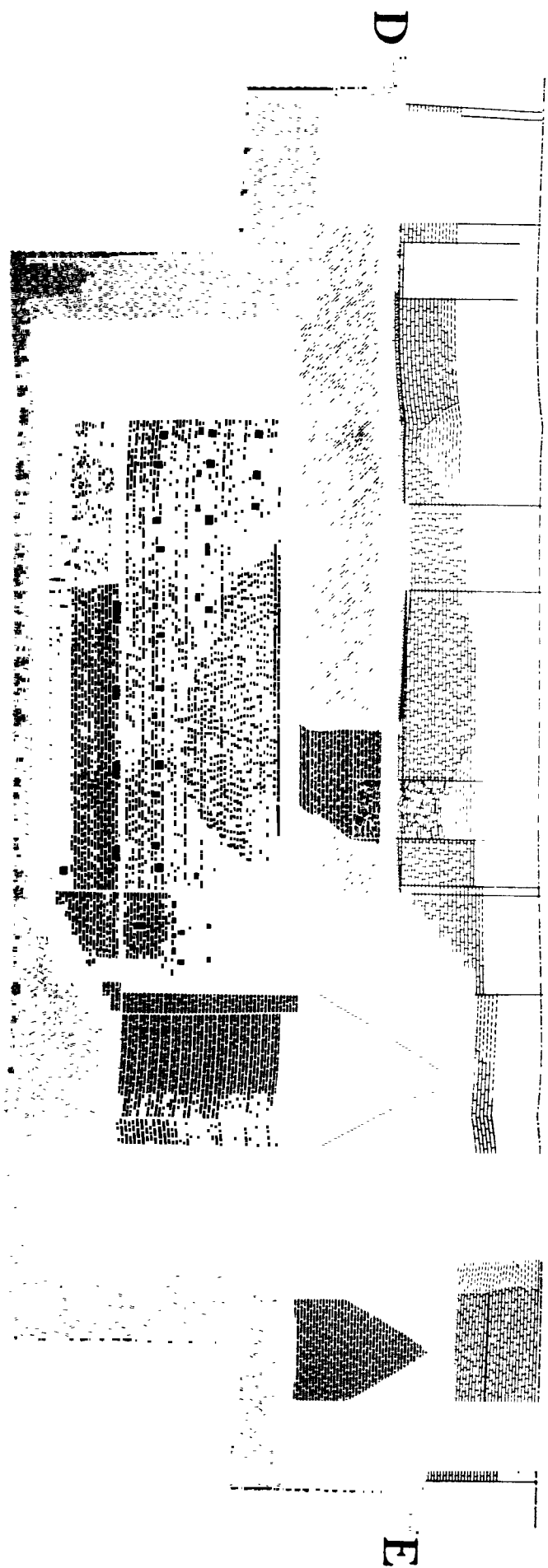
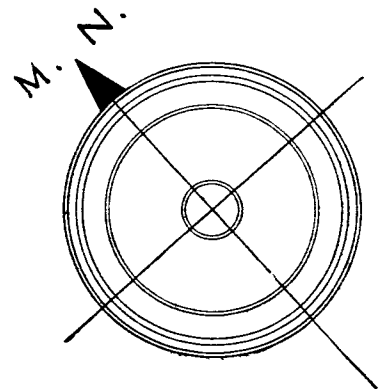
The staff consisted of myself and my wife, who as usual was responsible for the drawings and assisted in the field-work, and Mr. M. E. L. Mallowan, who for the sixth year in succession acted as general archaeological assistant; the epigraphist was Mr. Chauncey Winckworth, Reader in Assyriology at Cambridge, the architect, Mr. J. C. Rose, and Mr. P. J. Railton came as junior assistant in field work. My Arab staff was unchanged, Hamoudi being as ever in charge and excelling himself in the amount of work done, while his three sons, Yahia, Ibrahim and Alawi acted under him as junior foremen, the first doing all the photographic work also.

The main sites excavated were the royal tombs of the Third Dynasty, a palace built by Nabonidus for Bel-shalti-nannar near the North Harbour, and a large area in the south-east quarter of the city which gave us house remains of the Larsa period and also of the Neo-Babylonian. Apart from these, two smaller tasks were undertaken. Inside the Temenos enclosure there is a considerable area of low-lying ground extending from the temple E-Nun-Mah along the north-east boundary wall where it had been supposed that no buildings of historic date survived denudation; a trial trench driven across this has brought to light fragments of walling which, if followed up, should go far to fill in a blank patch in our plan and complete our knowledge of the topography of the Temenos; this information having been obtained, the thorough excavation of the site was postponed until next season. A shaft was sunk in front of the Ziggurat in the hopes of finding remains of the pre-Third Dynasty temple of Nannar. It was found that the Neo-Babylonian work had destroyed all historic foundations on what had been from very early times a high artificial platform the floor of which, made of plano-convex mud bricks, was discovered almost intact together with its containing-walls; the latter were remarkable in that the mud bricks of which they were constructed were of two types, small plano-convex bricks, often laid on edge and sloped in herring-bone fashion, alternating with large

rectangular bricks laid in flat courses; the walls would therefore seem to date to an intermediate period when the old rectangular bricks were being replaced in fashion by the plano-convex bricks which characterise an epoch between Jemdet Nasr and about 2800 B. C. The following-up of the prehistoric Ziggurat enclosure was left over till next season and the shaft was driven down to water level. Below the plano-convex pavement only one phase of construction could be traced, with scanty wall foundations and remains of a mud floor thickly littered with the clay cones and stone disks used for wall mosaic. In the stratification some difficulty was felt at first by the occurrence in the higher levels of quantities of painted al 'Ubaid potsherds which lower down failed and gave place to wheel-made wares and to Jemdet Nasr types; a close examination showed that the al 'Ubaid fragments had been deliberately mixed with the clay of the bricks and more especially with the mortar of the plano-convex and rectangular brick period, a phenomenon which is found in corresponding strata at Warka and can only be explained on the grounds of religious archaism. Towards the bottom of the shaft al 'Ubaid wares occurred freely in their true horizon; with them, at 11.0 metres depth, there was found a twisted fragment of gold wire (square in section and cut, not drawn) which is our earliest example of the working of precious metal. A fuller description of this site also must await further excavation.

THE ROYAL TOMBS OF THE THIRD DYNASTY

At the close of the season 1929-30 there had come to light, at the north-east end of the prehistoric cemetery, part of an extremely solid and well-built wall of burnt bricks set in bitumen, many of which bore the stamp of Bur-Sin. The building lay considerably lower than the palace of Ur-Engur, not far away to the west, and this fact, together with its proximity to the cemetery at a point where graves of Sargonid date were at unusually deep level, gave grounds for hoping that here might be the tomb of Bur-Sin. At the beginning of last season a start was made behind the exposed length of wall and it was at once found that the original building had, after its destruction, been overlaid by private houses of the Larsa and subsequently of the Kassite periods, and that these in their turn had been cut through by the foundations of the Temenos wall, of Nebuchadnezzar. The whole of this part of the Temenos wall, of which hitherto only the outer face had been traced, was now excavated and where necessary cut away, and a fairly consistent section of town planning was secured before work could be carried down to Third Dynasty levels. As the excavation proceeded it was discovered that the Bur-Sin building first found was really but an annexe of a much larger building which the brick-stamps in its walls assigned to Dungi, Bur-Sin's father (c. 2260-2220 B. C.); south-east again of this there was attached a



METRES
1 0 5 10 15 20 25 30

THE TOMBS OF THE THIRD DYNASTY KINGS
GROUND PLAN AND SECTIONS OF SUPERSTRUCTURE

second annexe also put up by Bur-Sin (c. 2220 B. C.); certain features of the brickwork make it probable (though not proved) that of the two annexes, the southeast is the earlier in date, a hypothesis which would agree very well with the striking similarity between the ground-plans of this and of the Dungi building and the irregularity and smaller scale of the north-west annexe.

In spite of irregularities, however, all three buildings alike are definitely modelled on the private house of the period. In each case a front entrance on the north-east wall leads through a lobby into an open court, surrounded on three or four sides by chambers, which in some instances correspond to the chambers in an ordinary residence. The difference lies in the scale of the building and the solidity of its construction, the richness of its decoration, the fact that it was of one story only, and in the appointments of some rooms, to be described later, which are never found in private houses. The discovery that under each of the three buildings there are great vaulted tombs seems at first sight to make the analogy with the private houses more complete, but against this we have not only the unexampled size of the tombs but the fact, to be explained later, that here the superstructure is both in construction and in importance secondary to the tomb, whereas in the private house the residence is the chief element and the tomb in every sense subordinate. A detailed description will supply the evidence for the above statements and for our further conclusions as to the nature of the buildings.

The Dungi Building.

This is practically a rectangle measuring 35 metres in length by 27 metres in width, the thickness of the walls being as much as three metres; all the angles were rounded externally. The south-east side was not continuous but had a bold salient for the greater part of its length, the south angle of this too being rounded. The wall face was relieved by shallow plain buttresses, the only exception to this being on the north-east side where the main entrance door was flanked by buttresses decorated with T-shaped vertical grooves such as are normal in religious buildings, and the corners of the jambs are resolved into a series of reveals. The entire north-east side of the building was much destroyed; it was clear from the way in which the walls were ruined down from south-west to north-east and from the stratification that the mound of débris which covered it after the Elamite destruction sloped in this direction and the more exposed walls had been pulled down by builders in search of bricks, probably in the Larsa period; on the north-east then the walls seldom rose above floor level and sometimes even their foundations had been dug away, whereas on the south-west they were more than two metres high. All walls were of burnt bricks laid in bitumen; up to the height to which they now stand there is no sign of any

transition to mud brick, but the character of the débris filling the rooms would point to the upper part of the walls in this building, as in the private houses, having been of unbaked bricks; but this is not certain, since a great deal of the filling is of mixed material, and the ruin seems to have served as a dump for the disposal of rubbish.

The main door leads through a small brick-paved lobby 1 into a large open court 2 [Plate XXXII, 1]. Originally this was brick-paved, sloped to the center where there is a drain of terra-cotta pipes running down into the subsoil; a diagonal line of paving-bricks accentuated the slope of the surface and lead the water to the drain mouth. An edging or narrow platform of brick, raised about ten centimeters, ran round the north-east, south-east and south-west sides; over this, against the south-west wall between two doorways, we found the remains of a brick altar with shallow bitumen-lined channels along the front of it, exactly like the altar in room 5. In the west corner of the court, on the other side of the doorway to room 6, there was a brick base about 1.30 metres high with a channel in front of it; it would seem to be in relation to the unusually wide doorway of room 7, and similar bases occur in corresponding positions in the courtyard of each of the annexes built by Bur-Sin; it is impossible not to connect these with the decorated bases found in the chapels of the houses of the Larsa age. In the middle of the court, by the drain, there was an oval terra-cotta bath lined with bitumen and bedded to the floor with clay; a similar terra-cotta bath was found in the court of Bur-Sin's north-west annexe. At some later date in the Third Dynasty, when Dungi's pavement had suffered from use, it was covered over with a smooth coat of very hard clay about ten centimetres thick; this was photographed by us and then removed.

Most of the doorways opening on to the court retained evidence, in the form of a bitumen mould, of the beam, circular in section, which had formed a raised threshold (being in fact the lower member of the door frame) and of the wooden jambs, while the ashes of the door itself lay thick in the entry; in three cases, rooms 4, 8, 9, there were found among the ashes fragments of gold leaf, shewing that the panels had been overlaid with precious metal. The walls shewed no trace of covering of any kind, and the brickwork had probably been left bare. In the rooms there were often remains of mud plaster, and this was always burnt to a deep red, the colour being so uniform that it was more likely to be due to the burning of wooden panels laid over the plaster than to that of the fallen ceiling. Traces of interior decoration were found. In room 8, near the door, was a crumpled fragment of gold plate cut into open-work patterns, small shield-shape holes, which were filled in with lapis lazuli; similar fragments of inlay, but in banded agate, were found in room 5; in room 9 there were tiny stars of thin gold and sun's rays of gold and of lapis, apparently from incrustation

in wood, together with small gold nails; the decoration of the rooms therefore would seem to have been extremely rich.

The east corner room 3 had in a late period of the occupation been divided into two by a mud-brick partition which perhaps did not rise to the full height of the walls. In the ashes which covered its floor were a number of stone "duck-weights," most of them split by the heat, and many stone hammers and grinders, some properly shaped, some mere pebbles; several of these shewed traces of gold, and they had clearly been used for hammering up the metal. It might be that this was a room to which offerings were brought and weighed and the gold hammered into convenient form, but it is equally likely that here the Elamites divided their spoil when they looted the building and tore down the gold plating from the walls. That the destruction of the whole building in about 1910 B. C. was due to the Elamites is beyond doubt. A number of tablets were found bearing dates which take us down into the reign of Ibi-Sin, so that the occupation must have lasted until then; the burning of the building and the looting of the tombs beneath it can only have been the work of a foreign enemy in possession of the city; the earliest houses erected over the site were of the Larsa Dynasty, by which time therefore the Third Dynasty structure was ruined and its sanctity gone; the Elamite invasion which brought to an end the reign of Ibi-Sin and the dynasty founded by Ur-Engur is the only historical event which can explain the destruction, and we may see a direct reference to this in the Sumerian lament over the fallen city — "the sacred dynasty have they exiled" — where the poet may be thinking not only of Ibi-Sin carried off into Elam but of the bones of his deified ancestors flung out from their tombs.

Room 4. In the doorway were found fragments of an inscribed alabaster vase of Dungi. In the south-east wall was a doorway leading out of the building into that of Bur-Sin; it was peculiar in having no reveals and might be thought therefore not to have been part of the original plan, but there was no visible sign of alteration and if indeed the door had been cut through the wall the jambs had been re-faced with a very clever imitation of the old brickwork. Close to the door there was in the thickness of the wall a low corbel-vaulted chamber which certainly was original; on the outside it was closed by a mere skin of brick which had been damaged when the wall of Bur-Sin's annexe was built up against it; on the inside it had been closed by a similar skin only one brick thick, and to mask this, every alternate brick in the corners of the jambs had been chipped back so that the new brickwork might show no break of bond: this is a trick employed several times in the Dungi building. Possibly the chamber had been intended for a foundation-deposit; in any case it had been broken open and looted by the Elamites. When we found it, the entrance had been very roughly blocked up again with mixed bricks projecting beyond the wall face, and inside were

two bodies and a number of clay pots of the Larsa period: some Larsa householder digging into the ruins below his foundations must have found the little chamber and had re-used it as a burial vault.

Room 5 was the most interesting in the building. The whole of the north-west end was occupied by a raised brick base divided into three parts, a lower ledge along the front, a low platform along the north-east wall, and a higher platform in the west corner; the back was destroyed by plunderers who had dug through it into the tomb below, but the front was almost intact. The brickwork was overlaid with bitumen, and sticking to this were found fragments of gold leaf, so that the whole must have been gilded. In the top of the front ledge were six channels running parallel with the front and arranged two deep; starting as shallow depressions they deepened as they ran and then, turning outwards at right angles, came to the edge and were continued as grooves down the front of the platform, emptying into six small brick compartments which formed a row on the floor in front of the platform; in these compartments we found wood ashes [Plate XXXII, 2]. On the top of the lower platform in the north corner there were the remains of one and apparently of two similar channels running down into brick compartments. Along the south-east half of the south-west wall and along the south-east wall was a low bench of brick covered with bitumen in which again there were long channels starting in front of a raised base which faced the door of the room, but these ended not in brick compartments but in cup-like hollows in the top of the bench.

The explanation which suggested itself for the channels and so forth in the west corner was that over each runnel there would be set a porous (or pierced) vase containing scented oil which, escaping from the vase, would run along the channel and trickle down into a fire made in the brick compartment below, and so would go up as incense before a statue placed on the high base behind. This theory is amply supported by a text published by Professor Langdon,¹ in which a worshipper describing a sacrifice he has offered says "seven kinds of sweet oil . . . have I burnt upon seven fires."

Room 6. This was approached from the court by a flight of brick steps, its floor being raised nearly two metres above that of the court. All but one brick of the pavement had disappeared and the room of the superstructure therefore contained nothing of importance. It might however be remarked that the presence of these steps as seen from the courtyard would increase the resemblance of the building to a private house, in which the stairs leading to the upper story are a constant feature and occupy much the same relative position. In room 7 the greater part of the pavement had been destroyed by plunderers digging through into the tomb below, and in

¹ *Babylonian Penitential Psalms*; Oxford Editions of Cuneiform Texts, Vol. VI, p. 51, l. 15; p. 56, l. 19.

consequence nothing of interest survived. The wide doorway is reminiscent of the wide doors of the "reception-rooms" in private houses and must mean that together with room 8 it was specially important (compare rooms 3 and 6 in the south-east and north-west annexes of Bur-Sin respectively); in both jambs of the door there were patches where the normal bitumen mortar had been replaced by white lime cement — the only instance of the use of this material as mortar before the Neo-Babylonian period, and here irregular and inexplicable.

Room 8. Facing the wide doorway were the remains of an altar of the same type as that in room 5; all the back of it had been dug away, but the hole did not go through to any tomb. Every altar of this sort, and there seem to have been eight in the three buildings, has been violated in precisely the same way, and the only explanation is that some votive deposit of intrinsic value was concealed in the brickwork. The Elamites were evidently well informed where to dig for treasure: they have overlooked nothing, and they seem never to have dug where there was nothing to be found. In the north corner of the room is a door to room 10. The fragments of wall decoration found here have already been described.

Room 9. On the pavement of the room, besides the fragments of gold and lapis inlay, there were found a curious stone pick-head and the feet with part of the stand of a piece of sculpture, a standing figure of a bull about one-third life-size, made of copper hammered over a wooden core — the technique with which we are familiar from older (First Dynasty) examples discovered at al 'Ubaid; there were also fragments of copper vessels.

Room 10 was badly ruined, the whole of its north corner having been rooted out to the foundations; there seems to have been a bench (compare room 5) against the north-west wall. An unusually wide doorway led into room 11, of which the greater part of the pavement had been destroyed by the plunderer's hole into the tomb beneath. The doorway to room 12, which was at the same high level as room 6, was occupied by a well-preserved flight of brick steps. Room 12 had lost its pavement, and the wall dividing it from room 6 had been so completely destroyed that there was only just enough evidence to prove its existence; whether there was a door through could not be ascertained.

The approach to the tombs lay beneath the high pavement of room 6. The paving-bricks had been pulled away and beneath their level we found mixed rubble, due to plundering excavations which, however, had not gone very deep; just below the crowns of the vaults the rubble gave place to undisturbed and remarkably clean earth which was the original filling. Whereas the foundations of Dungi's building on the north-east were relatively shallow, here the walls went down steadily as the lining of a great pit; in the middle this was open, but at either end it was roofed in by a high and massively-

constructed corbel vault; the north-west vault lay under room 12, the south-east vault occupied the south-east end of room 6 itself. In the centre of the pit there was a brick platform which had been originally reached by a flight of steps running through the north-east wall; these led not to the existing floor-level of room 7 but to a threshold about a metre below that level. The approach had been blocked by a wall which was flush with the wall face in room 7 but left a deep recess in room 6. The lower part of the blocking wall was made of thin bricks markedly different from those of the wall proper, but as soon as it rose to the level on the one side of the pavement of room 7 and on the other of that of room 6 the construction changed and every effort was made to mask the existence of the old door. In room 7 the alternate bricks in the corners of the jambs were chipped back so as to give the appearance of a trus bond, and the bricks now employed were not the thin ones of the lower section but identical in measure with those in the wall—it is only because they are more cleanly moulded and somewhat better fired that they can be distinguished from the old stock of which they are a deliberate imitation. On the side of the wall facing room 6 no bond could be contrived, but the change in the type of bricks employed comes as soon as floor level is reached. This means that the wall with the doorway through it belongs not to the superstructure as we have it at present, but to an older superstructure standing at a lower level, and that the door was blocked when the wall was incorporated in the present high-level building. Further proof of this occurs in room 7. In the north-west wall there was a doorway through into room 11 the threshold of which was at the same low level as the threshold of the old south-west door, and this door also had been blocked up when the existing pavement was laid, and here too the same effort was made to mask the former opening by the use of special bricks and of apparent bonding into the jamb corners above (but not below) pavement level. This distinction of two stages in the construction and use of the superstructure is most important.

The stairs in the blocked-up doorway led then down on to a brick platform [Plate XXXIII, 1] extending across the whole width of the brick-lined pit underlying room 6; from it, to left and right, there descended further broad flights of steps bordered on either side by a wide brick balustrade with stepped top. The steps running down to the left or south-east passed under the great vault and came to a door in a wall which was a continuation below ground of the dividing wall of the superstructure rooms 5 and 6; the door was closed by a brick screen blocking flush with the wall face, and when this had been removed, the steps were found to continue through the doorway and beyond it into the tomb whose pavement lay 3.60 m. below the level of the superstructure court [Plate XXXIV]. The tomb measured 7.70 m. by 4.15 m., with an internal height of 5.50 m.; the corbelled roof though

sagging was almost intact, the small hole at the north-west end made by the plunderers having done little structural damage. The steps running down from the platform to the north-west passed under the vault (which extended to the north-west outer wall of the building and was therefore longer than the south-east vault) to end in a small square landing; on the right-hand side of this, that is, in the north-east wall of the stair-pit, was a door approached by three steps contrived in the landing and blocked, when we found it, with a brick screen; the steps continued under the screen for the length of the door-passage and led to a brick-paved corbel-vaulted tomb lying under room 11 and measuring 10.70 m. by 4.00 m., with a height of 5.50 m.; the pavement of this and of the south tomb were at the same level. Both the tombs had one point in common; the original floor consisted of five courses of burnt brick set in bitumen and bonded into the walls; over this there had been laid a double layer of burnt bricks set for the most part on edge and with a certain amount of space between them, and above them mud bricks laid partly flat, partly herring-bone fashion, forming a new floor level 1.75 m. above the pavement proper; this floor ran right up to the outer face of the door passage, burying the lower steps, and the blocking of the doorways rested on the mud brick or on a line of burnt bricks which had been set here to act as a retainer for the mud brick; the scattered bones and fragments of clay pots, which were all that the plunderers had left of the furniture of the tombs, lay on the upper floor. The explanation was that Dungi's architect had been too ambitious and had fashioned his tomb chambers too deep down — actually he had penetrated into the Flood deposit — with the result that when the chambers came to be used they were found to be awash with infiltrated water, and the only thing that could be done at such short notice was to raise the floor level at the sacrifice of the proportions of the buildings: incidentally, from the fact that the same rough-and-ready measure was employed in *both* tombs it may fairly be inferred that both were occupied at the same time.

In the brickwork of the walls and vaults there were numerous holes which explained the methods of construction used. Near the top of the wall was a row of holes, long and low, in which had been inserted two beams, side by side, running back as much as two metres into the wall's core and set in bitumen; these projected twenty or thirty centimetres from the face of the brickwork and acted as brackets. In the outer vaults a horizontal beam was laid along the brackets; in other cases they directly supported long timbers which, sloping inwards and morticed together at the top, formed the framework of the centering. There was no planking behind this, at any rate not in the smaller vaults, but the bricks were laid immediately against the uprights, the line between them being presumably kept by eye; but as the vault rose, intermediate brackets were inserted and the upper part secured

by further timbering. The use of two comparatively slender poles to make each bracket was perhaps due to the cost of heavy timber, but it had this advantage, that where the uprights were set directly on the brackets their lower ends could be cut to a broad wedge and fitted between the poles, thus getting a safer lodgment.

The vaults, when we started to unearth them, were in a most dangerous state: not only had plunderers broken through them, but the bitumen mortar had lost its quality and no longer adhered to the bricks, which therefore were quite loose; the sides had sagged and many of the facing-bricks had fallen away and the rest were only supported by the earth which we proposed to remove. Our only course was to shore up the arches with timber. Luckily the holes in the brickwork remained, and by putting in temporary supports and digging down in small sections at a time until the holes were reached, we were able to put in a new centering which not only made the vaults safe but, instead of being an eye-sore, reproduced for the most part the constructional timbering used by the original builders.

All round the stair-pit there were in the brick walls other holes for timber on the level of the top of the central platform; these had no connection with the vaults but seem to have held beams for the support of a wooden gallery which floored over the entire pit, leaving only square openings through which the stairs ran down to the tomb doors. Such a floor can only have been part of the older temporary building, for before the pavement of the existing superstructure-room 6 could be laid, the whole pit was filled with earth. In this underground construction there are a good many features presenting problems which cannot always be solved, but not all can be discussed or even described in a preliminary report. The main facts that seem to emerge are these. The tombs, though designed as part of a plan which was to be completed later, were the *raison d'être* of the building and were constructed first, together with a superstructure some of which was purely temporary, some was to be incorporated in the later building; judging by existing remains the temporary superstructure may have been confined to the area overlooking the tombs proper: slight changes of line in the brickwork of the pit walls may indicate that even the temporary building was not strictly contemporary with the tomb construction but was added, perhaps after the funeral. In any case the presence of the building suggests that the funerary rites which it served lasted for a considerable time after the actual burial. The two vaults were occupied at the same moment and their doors were walled up, but the staircase to the doors remained open and the presence of the door in the superstructure wall implies that people came down the upper flight of steps to perform ceremonies in front of the doors or on the central platform and on the galleries which prolonged it above the tomb entrances. Then the superstructure as we have it was built, and when it was virtually

complete, with its floors at a higher level than those of the temporary building, the doors of the latter were bricked up, the galleries in the stair-pit dismantled and the pit itself filled in and paved over. At this moment a dramatic incident occurred. When we dug away the filling we found that in the upper part of the blocking of the door of each of the tomb chambers there had been made a small breach just large enough for a man to get through; the dislodged bricks were lying in front of the door covered by the clean earth imported for the filling. The tombs had been robbed and, obviously, robbed just as the earth was about to be put in; nobody would have dared to rob them when the pit was still in use, nor, if such sacrilege had been done, would the bricks have been left scattered on the floor and the breach unfilled; the robbers must have chosen their moment when the inviolable earth would at once hide all traces of their crime and they could afford to be careless.

The rulers of the Third Dynasty were deified in their lifetime and worshipped as gods after their death. The tomb then was intended to receive the king's mortal body, the temporary structure was for the ceremonies of his burial, the permanent building was for the perpetuation of his cult. In this regard the form of it demands notice. It is built not on the lines of a temple (and the temples of the Third Dynasty are known to us by several examples) but on those of a private house; it surely must have been conceived of as the residence of a deity whose human origin could not be forgotten any more than when he was alive on earth his divine character could be overlooked. Death here meant no change of attributes, only a recasting of their relative values, and although the form of service would necessarily be modified the "temple" was in all essentials the palace of the god-king.

The South-east Annexe of Bur-Sin

The building is really a copy, on a smaller scale, of that of Dungi. The walls are much slighter but are relieved with the same shallow buttresses and the doorway in the north-east facade is again flanked by buttresses with T-shaped vertical grooves rising from a projecting base similarly decorated, and the internal arrangements are almost identical.

Through the entrance-lobby 1 one passed into the central court 2, which was brick-paved with a well or drain in the middle made of bricks set in bitumen mortar; against the south-west wall, between the doors of rooms 5 and 6, there was a long low altar with bitumen channels along its top edge and a raised base behind; in the west corner, to the onlooker's left of the wide door leading to room 7, there was a brick pillar-base corresponding to those in the courts of Dungi and of the north-west Bur-Sin annexe.

Rooms 3 and 4 contained no features of interest. In each a hole had been dug into the pavement by robbers searching for the tomb or tombs below; at the north-east end of room 3 the breach had been effected and the

diggers saw that a single vaulted chamber ran below both rooms, whereon the men in room 4 abandoned their task as useless after dislodging only one of the roof-bricks of the vault.

Room 5. The pavement was flush with that of the court. Against the south-west wall was a brick altar with the normal channels and raised base, much destroyed by searchers for hidden treasure. Below the pavement was clean earth, the filling of the stair-pit leading to the tombs; the north-west end of this had been disturbed and the tomb door broken through. In room 6 much of the pavement had been destroyed by plunderers digging through it to the tomb. Room 7 was almost entirely filled by a very large brick altar, very much ruined. The back part of it seems to have served as a raised passage between rooms 8 and 9; the front part was in a series of steps descending from north-east to south-west and ending with a patch of bitumen flush with the pavement, in which were cup-like hollows surrounded by a low bitumen coping; green stains in the hollows showed that round-based copper pots had stood here. Room 8, through which one passed by the side door into Dungi's building, possessed no features of interest, but the door between it and room 7 was peculiar in that the north-west jamb was hollow and ended in a brick-lined pit going down a metre below floor level. The upper part of the jamb had been destroyed and the pit cleared out, so that it presumably had contained some votive deposit of value; I cannot quote any parallel for this. From the raised passage at the back of room 7, brick steps led through the north-east door into room 9; here, as in room 10, no objects of interest were found.

The arrangement of the tombs was a reproduction in miniature of that of the Dungi building. Below the pavement of room 5 a steep flight of brick stairs ran down from north-east to south-west; as they started on the inner line of the north-east wall and the stair-well is narrow, there was no space for a proper platform and the bottom step had to serve this purpose — indeed, part of that step had to be cut down to make the top step of the lower north-west flight. On either side of the central flight, stairways (with no balustrade) ran north-west and south-east to the doors of the tombs; one of these lay under room 6, the other under rooms 4 and 3 half-divided into two by a corbelled arch which supported the party wall between the two rooms of the superstructure. Even the position of the tombs, at right angles to one another and running along the two outer walls of the building, corresponds to that originated by Dungi, but here the mistake of digging too deep has been avoided. In the brickwork of the walls of the stair-pit an offset with a slight change of line coming at a level corresponding to the foundation-courses of the north-east side of the building indicates that work was discontinued at this point to be resumed later; and as the door from the court into room 5 of the superstructure does not agree with the upper flight of

stairs but is askew from it the independence of the two constructions, subterranean and above-ground, is proved, so that although no traces survive of a temporary superstructure such as we found in Dungi's building, we can argue to a similar ceremonial entailing a certain lapse of time between the actual burial and the completion of the "death-house" of the deified king.

The plundering of the tombs had been very thorough, most of the bones even having been removed, but in that under room 6 we found the conical stem of a black-and-white marble chalice bearing a long inscription, a dedication by Ur-Engur to Gilgamesh; it was an object rare in itself, but unfortunately threw no light on the ownership of the tomb.

The North-west Annexe of Bur-Sin

The north-west annexe is curiously irregular in ground-plan; it is built round an angle of the old Dungi building and its own outer wall is a succession of arbitrary salients; but internally it preserves that general resemblance to a private house which was so striking in both the other buildings of the group. The outer wall with its shallow buttresses and decorated doorway is true to type; the rounding-off of two of the corners seems to be due to a definite wish to harmonize with the Dungi construction.

The lobby 1 leads to the courtyard 2 which was brick-paved and sloped to a central drain; against the north-east wall was a bitumen-proofed clay bath bedded to the pavement with clay mortar, and in the south corner near the wide door of room 4 there stood a brick pillar-base smoothly plastered with bitumen. Room 3 had at the end farthest from the door a solid brick flight of steps running up against the north-west wall, which was destroyed down to the level of the top step. What happened above, it was impossible to say; there was no landing such as would allow of a return of the stairs along the north-west wall, nor would the ground-level outside allow of a door through the wall; it is possible that this is not really a staircase but a stepped altar or base, but for such a construction we can produce no parallel.

The north-west jamb of the door to room 4 had been destroyed by a Larsa tomb which had been hacked down into it, and much of the pavement of this room and of room 5 had been pulled up by the robbers making their way into the vault beneath; in room 4 a few bricks rising above floor level were enough to show that there had been here an altar of the normal type with bitumen channels. Room 6 was largely taken up with another such altar which ran along almost the entire length of the north-west wall; as usual it had been cut into by treasure-seekers; in the doorway the copper shoe of the hinge-pole of the door was found resting on its pivot-stone at the bottom of the hinge-pit. In room 7 there was a large clay store-jar, apparently part of the original furnishing, and here too were found tablets dating to the later years of the reign of Ibi-Sin.

It was in its underground arrangements that this annexe showed the most marked departure from the two other buildings. It contained three tombs, one under rooms 4 and 5, one under room 6, and one under the pavement of the courtyard close to the old Dungi wall; all lay immediately below the surface, their vaults supporting the paving of the superstructure, and the original approach to them had been by shallow pits or by a sloped *dromos*, not by any such stairway as forms the main feature of the other two pairs of tombs.

Beneath rooms 4 and 5 was a long narrow vaulted chamber, of which three walls were the outer walls of the superstructure but the fourth, the north-east, lay inside the area of the chambers above and had no connection with the wall dividing room 4 from the court; it was entered by a doorway towards the north-west end of its north-east side which gave on a small pit; the pit had been filled and the door masked by the construction of the wall dividing room 4 from the court, and when the robbers set to work to open the tomb door they had to cut through the foundations of the wall in order to get at it. Similarly the tomb under the courtyard, a small affair measuring only 3.20 m. in length by 2.15 m. in width, had its door at the north-east end, and that under room 6 had its door at the south-west end, both opening on to a common approach-pit; the foundations of the north-east wall of the court passed right across the pit and effectually blocked the entrances of both tombs. Here again then the superstructure was posterior to and independent of the tombs, though the tomb-builder must have had the plan of the superstructure in view.

The existence of the north-west annexe raises the question, why did Bur-Sin require two tomb buildings? and, as a corollary, who was buried in the tombs?

As to the authorship of the buildings there is no doubt at all, for the brick-stamps settle the point; but Dungi might have built a tomb for his father, or prepared his own tomb in his lifetime (in which case the superstructure was added after his death with bricks bearing his stamp), or Bur-Sin might have built it for his father with his father's bricks: and the same three explanations are possible for the Bur-Sin buildings, but here the matter is complicated by the fact that there are two of them.

We have seen that in the Dungi building and the south-east annexe the two tomb chambers were occupied simultaneously, and bones were found in each chamber; can this mean a continuance in the Third Dynasty of the human sacrifice which marked the funerals of the prehistoric kings? Unfortunately nothing was found in the plundered tombs which threw light on these and other problems; the only thing that seems certain is that we have here the burial-places of kings of the Third Dynasty and the funerary houses in which their cult was celebrated.

THE HOUSE SITE

The site selected for excavation lies in the south-east quarter of the town area where a long high ridge gave promise of well-preserved ruins. The object in view was to get some idea of the town-planning system employed in any one period, to throw further light upon the character of the private house, and to secure documentary material. Consequently work had to be carried down to such level as seemed likely to give the most complete and consistent results of the sort, and no further; we had to confine ourselves to the first period whose remains were found in tolerable condition. Over the greater part of the site the late ruins were very fragmentary. A few disconnected wall-fragments of the Neo-Babylonian age and others, almost as uninformative, of the Kassite period occurred in the higher levels, but below these we encountered well-built walls standing to a height often of two and three metres. The walls had been constantly re-used, new floors being laid down between them and minor alterations made, so that in themselves they represented a considerable lapse of time; but in nearly all cases we were able to distinguish one uniform and contemporary level accurately dated by the tablets found on the pavements of the rooms; such documents, which were found in considerable numbers and widely distributed, belonged almost invariably to the Larsa period and generally brought us down into the reign of Rim-Sin. The fact of the tablets being so many and so scattered might imply the destruction of the houses and the breaking-up of business archives; the phase of occupation with which they were associated was marked by the destruction of walls and the burning of woodwork; the obvious inference is that here, as elsewhere on the town site, we have evidence of the looting of the city at the time of its capture by the Babylonian forces after Hammurabi's defeat of Rim-Sin, in about 1910 B. C. As the ground-plan [Plate XXX] shows, the area excavated by us was a large one, and the buildings on it as cleared were standing in the latter part of the twentieth century B. C. I have already stated that pavements belonging to these buildings were encountered at higher levels than that of the Rim-Sin period, the houses having been repaired after the Babylonian disaster, and it is also true that in very many cases the walls went deeper down and there were lower floor-levels belonging to earlier phases of the same buildings, whose foundation may have gone back to the Third Dynasty of Ur; we sometimes tapped these levels when excavating the tombs of the Larsa age lying beneath the chamber floors. During a long period which lasted well into the First Babylonian Dynasty, the lay-out of this quarter of Ur altered very little; there was constant patching and re-building, as a result of which the levels rose considerably, but the houses were to all intents and purposes the same; in the few cases therefore where no accurate dating evidence was forthcoming for the particular floor or pavement exposed by the excavators, it was none the less



HOUSE SITE, LARSA PERIOD

safe to assume that the walls gave faithfully the ground-plan of the Larsa house.

It will be seen that at this period town-planning was conspicuous by its absence. The streets are narrow, unpaved, and wind between houses whose irregular frontages depend, clearly, on the accidents of private ownership; building blocks are so large and so crowded that to houses situated in the hearts of them blind alleys are the only means of approach. The dwelling-houses conform to one type more or less according to the possibilities of the site; the central court entered from a lobby and surrounded by the living-rooms, with a stairway going to the upper floor, is the basic idea of buildings of very different sizes and of forms apparently very diverse. Scattered amongst the residences are smaller buildings which can only be shops; the simplest of them consist of two rooms only, a booth-like "show-room" opening on to the street sometimes with a front entirely open, and behind it a long magazine or store; in some cases the back room is divided by cross-walls into two or even three compartments; such are Numbers II, IV and VI Store Street, and V, VII, IX, VIII, X, and XII Paternoster Row and I and II, Bazaar Alley.¹ Four buildings, all in prominent positions, are public chapels; two of these are at Carfax corner, one juts out into the little triangular *place* in Paternoster Row [Plate XXXIII, 2] and one is in Church Lane facing the opening of a side street which we did not excavate.

The walls of all the buildings are constructed with burnt bricks below and mud bricks above, the wall face originally plastered and whitewashed so as to disguise the change in material. The proportion of burnt brick varies greatly; in internal walls it may be no more than a damp-course three or four bricks high; a boundary wall, especially one facing on the street, may be of burnt brick to the full height to which it is preserved, that is, to three metres or more. With the constant rise of ground levels, new pavements might be laid against the mud brick, the burnt-brick damp-course being completely buried; but its need was so well recognized that when the same rise in levels tended to make the ground-floor rooms impossibly low and reconstruction was enforced, it was a common practice to raze the walls to the new ground level and rebuild them with a fresh burnt-brick damp-course laid along the top of the old mud brick. Generally the rise of level in the street would be faster than that in the houses, so that a high threshold would be added to the front door to prevent mud and refuse from spreading into the lobby; this is well seen in doors XI, XI-A, XI-B of Paternoster Row, where a flight of steps leads from the street to the low-lying pavement of the entrance-rooms. To anticipate this, when a new internal floor was laid down, it would

¹ In the plan of the town site excavations, the number of each building is put in Roman numerals just inside the street door; the entrance lobby is in each case Room 1 (sometimes omitted for lack of space) and the numbers of the other rooms are in Arabic numerals.

be put well above street level and the threshold would be stepped up from the outside—only in time to be caught up by the accumulating rubbish of the street.

The type of the houses is well illustrated by No. III Straight Street which, though somewhat irregular in ground-plan (it was built up against older buildings in Church Lane) and altered in minor respects by different owners combines most of the features found in other houses. The lobby, here L-shaped, leads into the paved central court 2 which has a drain in the middle and low brick stands, probably for water-jars, against its north-east wall. As the visitor enters, he has on his left two doors of which the farther contains the staircase leading to the upper rooms; the treads in the thickness of the wall and the landing beyond were of solid brick, the return flight was of wood and ran up over the small chamber 3 which, with its paved floor and drain, was a lavatory. Room 4, containing a low brick bench, probably for a bed, and a fireplace, was perhaps a servants' room, and room 8, with a door leading out into 13, must also have been a service chamber; room 9 (of which the back door was not original) was the kitchen and contained a circular bread-oven and a raised brick cooking hearth as well as an open fireplace. Room 6, entered by a very wide door, was the reception-room; as usual it is long and narrow, closely resembling the reception-room in a modern Arab house, which is long so that runner carpets can be stretched against the wall for the guests to sit on, and wide enough for the mattresses of those who are entertained for the night to be laid across it in a row. The tiny room 5 has a paved floor and drain, and must be a washing-place for the guests; the equally tiny chamber 7, which is scarcely more than a passage to room 10 but has the door from 6 so placed as to leave a deep cupboard-like recess in the left, may have been for the equivalent of the great press in which the Arab stores his guest-room bedding. The upper storey, reached by the stairs and a wooden gallery running round the court 2, extended over these rooms only.

Room 10 is the chapel of the house, with behind it 11, a very small room which in some cases at least served as a library or store-room for the business archives of the proprietor—thus, finds of tablets were made in room 11 of No. II Church Lane, in room 6 of No. XIV Paternoster Row, in room 3 of No. II Bazaar Alley and in room 7 of No. I Broad Street. It is normal for the chapel to be at the back of the house and approached by a door through the guest-room; a difficulty seemed to arise as to its lighting, but this was solved by a discovery in the chapel (room 5) of No. IV Paternoster Row, for in the north-east wall of this, at a height of nearly two metres from the floor, there was found a hole going right through the brick work, a lodgement for a heavy beam, about two and a half metres from the altar end of the room; it was clear that this beam supported the outer end of a pent-house

roof which covered in part of the room and left the rest open to the sky; the covered part is the shrine, under the pavement of the open part lies the family burial-vault. This discovery does away with the further difficulty which we had felt as to the sanitary condition of a house which had burials immediately below the pavement of a closed-in room. Against the far wall of the chapel stood a low brick base or altar¹ usually plastered with mud and whitewashed; in one instance, room 11 of No. III Boundary Street, we found *in situ* on the latter the clay platters which had held the food of the offerings. In the wall behind the altar was a square recess, like a hearth, flat-topped, from which there was carried up in the wall a deep groove or open chimney which did not, however, go through the roof as a chimney naturally would, but ended abruptly at what would appear to have been a little below roof level (usually the wall was ruined down below this point, but in room 3 of No. VIII Paternoster Row the wall was of burnt brick throughout and stood to a height of nearly four metres, and the "chimney" ended below this point with the wall-face running flush above it). I should explain the recess as a hearth for burning incense; the open chimney would provide the draught necessary for its burning, and the stopping of the chimney at the top would spread the smoke of the incense over the room instead of letting it escape through the roof.

In the corner of the room, against the altar but distinct from it, was a square pillar-shaped base averaging 1.50 m. to 1.75 m. in height. It was built of brick (generally mud brick, with a burnt-brick base and a flat top of a single course of burnt bricks) and was mud-plastered and whitewashed; the exposed side and front were always decorated with a pattern worked in relief in the mud plaster and though there was differences of detail the pattern was always an imitation of wood panelling. Plate XXXV, 1 shows similar panelled bases in a house in Niche Lane. Such bases can be seen elsewhere, as on Kassite *kudurrus* or boundary-stones, where they support the emblems of gods, and they also recall the thrones of gods as represented on seals of the Third Dynasty and Larsa periods: we can safely assume that in the chapels they were the stands on which were placed the emblems of the actual statuettes of the household gods.

In most of the chapels, though not in all, we found, immediately in front of the panelled base, let into the pavement but virtually flush with it instead of being buried beneath it, a clay jar or bowl containing the bones of an infant. Occasionally there was more than one such bowl (in a chapel excavated four years ago in another quarter of the town there were over thirty), but one was seldom lacking, and its position as regards the base was identical:

¹ Only in one case, the chapel (room 11) of the large building No. XI Paternoster Row, did the altar stand clear of the wall, but even then the pillar was against the wall, in the corner of the room.

it was quite independent of the brick family vault under the pavement of the open part of the room, and where there were subsidiary coffin-burials these always lay fairly deep and not under the roof. Whether this points to a rite of infant sacrifice or simply means that an infant, dying a natural death, might be placed under the special protection of the household god there is no archaeological evidence to show.

Outside the house proper lay the walled area marked in the plan 12 and 13. Originally there had been an independent entrance from Straight Street, but this was walled up, apparently when the door was cut through the house wall of room 9; 12 was certainly an open court; 13 was divided into three by short wall-lengths which left wide gaps or passages between their ends and the face of the house wall; probably the cross-walls supported pent-house roofs, so that there would be a row of three open sheds with an unroofed space along the front of them communicating with the court 12, outhouses of this sort might be attached to any house, compare also rooms 5, 6 and 7 of No. IX Church Lane.

NOTES ON INDIVIDUAL HOUSES

Boundary Street Nos. I and III. These were communicating, and No. III seemed to be a shop, with a brick counter along two of its walls, attached to the dwelling-house. The staircase was unusual, being wholly inside a room 7 and running around three of its sides, with a lavatory recess underneath it. Under room 8 was a brick tomb. The chapel 11 was peculiar in having two panelled bases, one on each side of the altar, and the incense-hearth in the side wall [Plate XXXVI, 1].

In Niche Lane, so called from a curved recess in one of its walls, No. I was a very small but normal house owned apparently by a moneylender; No. III had been confused by frequent alterations and did not seem to be a residence at all; No. V consisted of three rooms of which that at the back was a chapel, and therein resembles No. VIII Paternoster Row and No. X Straight Street; it may have been a shop with chapel attached; the one-roomed places VII and IX should be shops. No. II in the same lane is of the type of the normal private chapel (the original door faced down the lane at the north-east end but was bricked up when the south-east door was made) but does not belong to any house; it may have been owned by someone who had a separate residence, but later it was remodelled and presumably used for a different purpose. No. IV is a sprawling house of the normal courtyard type possessing no features of interest.

No. I Old Street was approached through a narrow alley leading to the usual lobby and courtyard. The house was originally larger than at present, having chambers on all four sides of its court, but the last owner, Ea-nasir, walled off those on the south-east and sold them to the owner of No. VII

Church Lane who seems to have been enlarging his premises at the expense of two neighbours. A peculiarity is that the guest-room 5 possesses an altar and tomb beneath the floor and seems to have been used as a second chapel although room 6 was regularly constructed for that purpose.

On the western limits of our excavation there is an open space laid out in part over the razed walls of earlier buildings, which from an oven in the middle of it we called Baker's Square. In house No. I opening on the square we found a large clay tablet giving the paradigm of the Sumerian verb with the equivalent of its inflections in Babylonian, a very important document, unfortunately isolated. The house was normal except in that the small room 7 behind the chapel 5 had once had a second door giving on the square; this had later been walled up. Probably belonging to the house and approached by a passage behind it was the building I-B which was specially interesting as giving us one of the very few examples of industrial constructions: an original chapel with two small rooms has been demolished and thrown into a single large open court 2 off which opened a stoke-room 3 in whose walls there were three arched stoke-holes [Plate XXXV, 2] serving three circular furnaces in rooms 1 and 4; the purpose of the furnaces is not certain, but since under 2 we found a coffin in which with the corpse there had been deposited miniature copper models of tools which may be those of a smith, and since the furnaces are definitely not bread-ovens, we may assume that they were for smelting copper.

From Carfax there branch out five streets of which Broad Street was too ruined for more than one house in it to be excavated, and of Church Lane nearly the whole of one side had gone leaving only one much ruined house to be planned. In the open space at the cross-roads stood a brick pillar whose use I cannot conjecture.

No. I Broad Street gave us one of our most important discoveries. The house was originally normal in plan with courtyard, surrounding rooms (on three sides) and chapel [Plate XXXVI, 2], the only real difference being that the chapel lay behind the staircase instead of behind the guest-room and that a passage ran between it and the back wall of the house 9. At a later date three of the doorways opening on to the court were walled up, so that from it there was direct access to the lavatory and the guest-room only, while the front door led only to the chapel 8 and by the stairs to the upper storey; a door with descending steps gave direct entrance from the street to the court. This structural change was explained by the tablets of which nearly two thousand were found in the building. Some hundreds of these were of the regular "school exercise" type the flat bun-shaped tablets used for fair copies and so forth; there were very many religious texts perhaps used for dictation or for learning by rote, some historical texts, mathematical tablets, multiplication tables and so forth, as well as a quantity of business records

apparently referring to temple affairs. That there was a small school on the premises is obvious; probably the school-master was a priest; the courtyard and guest-room were used as the school, and the alterations were designed to isolate these from the rest of the house, which preserved its private entry while the scholars came straight from the street to their class-room.

No. III Store Street, next door to the school, lay at a higher level but was of old foundation, as tablets found in room 9 were of Third Dynasty date; there was nothing striking about its plan. Next to this again, No. V also lay high up, the threshold of the front door being raised to the full height of the standing wall; only two of its rooms were preserved, but behind them and to the side there was a series of sunken chambers more than two metres deep with heavy walls of mud brick plastered with mud; there was evidence enough to show that these had been floored over and the walls of a super-structure in burnt brick carried along the top of the mud-brick cellar walls; the sunken chambers are in fact cellars or underground magazines, possibly for grain (a little grain was found adhering to the walls), which would be reached by trap-doors in the floors of the upper rooms. No parallel to this has been found elsewhere on the site, but such underground doorless compartments can scarcely be explained otherwise. Nos. II, IV and VI Store Street were shops of the "lock-up" type. In Paternoster Row, No. III was a private house, curiously irregular thanks to the shape of its building-plot and chiefly remarkable for the preservation of its staircase, of which the beginning of the second flight remained with the corner bricks of its first tread neatly rounded off. Nos. V, VII and IX were probably shops with magazines or work-rooms behind. Beyond these came a very large building having three entrances to the street (XI, XI-A, XI-B), perhaps a khan or inn; judging from the thickness of the walls and the solidity of the staircase in particular it would seem to have been three storeys high. Room 2 is the courtyard, brick-paved like nearly all the rooms, and with a central drain; 3 was also unroofed, and in the plaster of the wall facing the street door there was the impression of the peaked roof of a low wooden shed which resembles and may well have been a dog-kennel. Rooms 5, 6 and 7 might have been stables or store-rooms, the first of them almost entirely dark; 8, which was not fully excavated, promised to be the kitchen; there were found in it large clay boxes divided into compartments which elsewhere occur in kitchens and were probably used for storing the less bulky foodstuffs. Of the stairs, three flights were more or less preserved; the fourth flight, made of wood, turned over room 7 and, through a door above the door of that room, led on to the gallery running round the court. The recess at the bottom of the staircase was utilized for a bread-oven. Room 10 was the reception-room, with a separate entrance from the street through the little triangular room to the north-west. A door (not original) had been cut through

the wall into room 16, part of what had been a separate small house composed of a court 16 and three rooms 17, 18, 19 with a door in 19 to the street, now walled up; these may have formed a private suite or the residence of the innkeeper. 14 is a passage leading to 15, the lavatory, and to 11, the chapel, which was also reached from the court by room 9; two side doors in this gave on what was apparently a lane, but at this point our excavations stopped. In the small room 12 behind the chapel altar there were several infant burials in clay bowls. A chapel and two other rooms beyond this belong to a house not fully excavated. No. 13 Paternoster Row also was only partly cleared.

On the other side of Paternoster Row, the first building was too ruined for its character to be made out; it was possibly a shop. No. IV was a large and well-preserved house with two chapels 4 and 5, of which the latter afforded evidence for the pent-house roof over the shrine. From the entrance-lobby a side door led to what seems to have been an annexe of the house proper, a complex of four chambers of which the largest 4 contained bread-ovens; these rooms formed an L enclosing the small corner premises No. VI which certain tools and hammer-stones might identify as a workshop. Nos. VII, X and XII appear to be shops; in the yard 3 behind XII were found many tablets. No. XIV, part of which had been sacrificed for the building of the Bazaar Chapel, also produced a large hoard of tablets all found in room 6 behind the chapel; room 3 was a kitchen almost entirely taken up with stoves and ovens, and as it had a wide window opening on the street it may have served as a confectioner's shop.

In Straight Street, No. IV was much ruined and had been constantly remodelled. The buildings VI and VIII, each consisting of a range of communicating rooms ending in one entirely filled by a brick burial-vault, are difficult to explain; No. X is rather similar, but as it has a common front door may be an annexe of XII, a small house of normal type; VII is also small but normal.

Most of the houses on Church Lane beyond the Pa-Sag chapel were ill preserved and presented few features of interest. No. V was an old building and much of the existing structure dated to the Third Dynasty; No. VII on the other hand, built at the expense of No. V and of Ea-nazir's house on Old Street, belongs to the latter part of our period. The entrance is by a long passage which also serves as back entrance to Ea-nazir's house; the lobby leads into the normal courtyard 2 with service-rooms and a stair of rather unusual form in that the return flight doubled back inside the staircase instead of passing at right angles over a lavatory. The small guest-room 5 and the chapel 6 originally belonged to the house next door; in room 7 was a bitumen-lined pit containing a number of tablets. No. IX Church Lane was also approached by a long private passage having on one side a

row of communicating magazines 1-4 while three more 5, 6, 7 seemed to be more nearly associated with the house. The house had lost some of its rooms when the Ram Chapel was fitted up, and its foundations went very deep; the back rooms 5, 6, 7 had all been destroyed below floor level and could only be planned from the underlying walls of the Third Dynasty building; room 8 was the chapel. House No. II on the opposite side of the street had been burnt and most of its walls were razed to the floor; the entrance was through two lobbies into the central court 3; room 5 was the staircase, 8 the reception-room and 9 the chapel; in the narrow room 11 behind this were many tablets which had been stored in clay jars. The further end of the building had been completely destroyed.

THE PUBLIC CHAPELS

There remain to be described the public chapels, of which four examples were discovered in the excavated area. The interest of these buildings, which are quite new to us, is that they illustrate a phase of the religious life and practices of the Sumerians hitherto unknown. The state temples of the great gods are familiar to us, and so now are the chapels in private houses dedicated to the domestic deities; between these come the little wayside shrines, of the lesser gods, excavated this season.

At the corner of Straight Street and Church Lane was the chapel of Pa-Sag, its door opening on Carfax [Plate XXXVII, 1]. Lying beside the north-east door jamb was found a terra-cotta relief 0.61 m. high representing the human-bodied bull-legged demon whose function seems to have been to keep away evil spirits, especially from doors; such are nearly always in pairs, and it is probable that two reliefs of the sort were fixed to the chapel wall flanking the entrance, though of the second no trace was found [Plate XXXVIII, 1]. Three steps in the doorway led up to the raised pavement of the chapel and through a passage with a recess on the right side 1 into the main court 2. On the left there was a small cupboard or compartment which served as a repository for *ex-votos*; there were various clay pots, two clay models of beds and one of a chariot with the figure of a guardian demon in relief on the back-board, and many stone mace-heads; one of them bore the inscription "the property of Pa-Sag."

At the back of the courtyard was the sanctuary 4. Immediately in front of its door, facing the entrance of the shrine, was a detached brick altar; against each jamb of the door was a brick base. Between the altar and the left door-jamb lay fallen a square limestone shaft 0.74 m. high and 0.20 m. across, very roughly worked (it had perhaps originally been faced with plaster) having a cup-like hollow in its top and high up on each side a crudely-carved design of birds or human figures; its position suggested that it had fallen from the base by the door [Plate XXXVIII, 2]. In the east corner

of the court lay, broken in two, a limestone figure of a goddess (height 0·51 m.) wearing a long flounced dress and a flat-topped head-dress on which were roughly-incised lines filled in with yellow paint, probably meant to represent a "hair-net" of gold ribbon such as is found on the women of the pre-historic graves; there were traces of black paint on the hair and of red on the flesh, and the eyes were inlaid with shell and lapis lazuli [Plate XXXVIII, 3]. The figure had stood on a wooden base, apparently in the form of a box, for inside it were found a whet-stone and a small copper statuette of the goddess wearing the flounced skirt; the arms had been made separately, and as they had disappeared, leaving no trace, had probably been of wood [Plate XXXIX, 1]. Close to the statue, against the north-east wall, there was the skull of a water-buffalo, remarkably well preserved; it looked as if it had been a trophy hung on the wall.

The door of the sanctuary had reveals on the outside and a bolt-hole in the pavement showed that there had been here an outer door; inside this, between the inner corners of the jambs, was an inner door or screen consisting of a wooden frame filled in with panels of reed which at the moment of destruction had been left standing half-open. The lower part of it, embedded in the fallen mud brickwork of the walls, had left on the soil an impression so distinct that it could be photographed as the original, showing even the grain of the framework and the form of every reed [Plate XXXVII, 2]. Behind this there was a shallow niche in the back wall of the sanctuary in which, on a low whitewashed mud base, there still stood in position the cult statue of Pa-Sag. The statue (0·37 m. high), which was of limestone, originally painted and with inlaid eyes of shell and lapis, represented the goddess standing in a long plain garment reaching to the feet. It had been damaged in antiquity, the lower part of the garment and the feet being destroyed and the body broken in half; the two pieces had been stuck together with bitumen and the figure sunk in the mud of the base with bitumen plastered round it and smoothed off so as to give the effect of a spreading skirt and to disguise the incompleteness of the figure, which was of course rendered unduly squat by the loss of its feet. [Plate XXXIX, 2].

In the corner of the sanctuary there was a very large clay jar, and by it a small collection of inscribed tablets of a business character, apparently connected with the affairs of the shrine, records of service, details concerning landed property, and so forth. Between the sanctuary and the right-hand wall of the building ran a passage giving access to two small rooms, of which one had a door on to Straight Street; these may have been accommodation for the guardian of the little chapel.

The building could hardly have been better preserved than it is; everything is in place or almost in place, and we have a very perfect picture of a type of structure absolutely new to us. The only point that might be called

in question is the dedication. Pa-Sag, a little-known deity, has been assumed to be male, whereas the two statues and the little copper statuette found in the chapel are definitely female; actually the texts on which the sex of Pa-Sag is based are not very clear, and further there are cases in the Sumerian pantheon in which the sex of a deity is duplicated or confused; in the present instance it would be impossible to disregard the evidence of the site, even though it were in more direct conflict with other evidence than is the case. The special province of Pa-Sag was the protection of travellers in desert tracks; no *ex-voto* could be more appropriate than the stone mace-head; at the present time any Arab going out into the desert will be armed with a cudgel weighted with an identical head of stone or hardened bitumen.

At another corner of Carfax, between Store Street and Paternoster Row, was another chapel, Carfax Chapel (so-called because its original dedication is unknown), which is smaller and simpler in design. The ground-plan is triangular and the door comes in one side towards the apex of the triangle (the building has been remodelled several times and the position of the door altered, but the chapel is described in its last phase, which is probably that of the late Larsa period) leading directly into a little irregular court, also triangular, the base of which has been partitioned off to form two compartments, the sanctuary proper and another room. In the court there was a raised base in the apex of the triangle and another on the right side of the entry door; a rough circular limestone shaft with a cup-hollow in its top was reminiscent of the carved shaft in the Pa-Sag chapel. On the ruins of the thin screenwall of the sanctuary, which had been closed by a door with a timber frame and reed panels, was found the cult statue, a limestone figure of a goddess (height 0.43 m.), seated and wearing a long flounced garment; the eyes were inlaid, and the hair shewed traces of colour [Plate XXXIX, 3]. Inside the sanctuary was a clay box measuring 0.47 m. by 0.30 m. and 0.17 m. high decorated with figures in relief, snakes and a very rudimentary female figure; somewhat similar clay boxes and lids with the snake ornament have been found elsewhere on the site in strata of Larsa date, but their use has not been known; it is therefore the more interesting to find one in position in a shrine. The snake emblem would seem to connect the goddess with some chthonic cult, but there were no inscriptions to identify her.

A somewhat similar chapel stood farther along Paternoster Row facing down the street at the corner of a little alley which ran through what was apparently a bazaar. A high flight of steps led to a door with ornamental reveals [Plate XXXIII, 2]; the interior was divided into a forecourt and a sanctuary, the latter having the normal statue-niche in its back wall. No objects were found here. Two-thirds of the way up Church Lane there was another building closely resembling the Pa-Sag chapel except for the fact

that it was double, a wider court having two sanctuaries at its far end. Steps led up from the road to a small antechamber to the court 2. In this was the free-standing altar in front of the first sanctuary door, against the jamb of which was a brick base; the sanctuary consisted of two chambers (3 and 4) and had no statue-niche in the back. The second sanctuary was also double (rooms 5 and 6) and had no altar in front of its door but had a brick base against the door-jamb. The entire north-east side of the building was destroyed. The only object found here was a very fine head of a ram in dark steatite, made in two pieces (height 0.08 m.); it is the head of a ceremonial staff such as would be set upright on either side of the statue [Plate XL, 2].

Two other objects certainly connected with chapels of this sort were found loose in the soil covering the ruins. One [Plate XL, 1] is a terra-cotta relief 0.73 m. high, resembling that found by the Pa-Sag chapel door, but representing a goddess holding a vase out of which run two springs of water. The other is a fragment 0.17 m. high, the upper part of a clay figure in the round, a seated god with horned crown and long beard wearing a fleece cloak over one shoulder; it is very finely worked and of particular interest in that over the whole surface the paint is fairly well preserved [Plate XL, 3]. Like the limestone statues, these clay figures were all painted. The god had black hair and beard, his crown and some of the beads of his necklace were yellow, the flesh was tinted red and the fleece black and white. The Pa-Sag demon was painted red all over except for the hair and beard, which were black; the goddess relief has lost all traces of paint.

In a preliminary report there is no space to describe the other objects from the town site, mostly found in the graves beneath the house floors or in graves which underlay the vanished houses of higher levels, though some of these, especially the examples of Kassite and Neo-Babylonian glass were very interesting. The tablets too must await further study; here I can only say that we seem to have material enough to identify the owners of most of the houses of the Larsa period and to learn something at least of their activities. These documents, not always of any great interest in themselves, gain immensely in value from their association with individual houses and should furnish a remarkably detailed account of this quarter of the city of Ur.

THE NEO-BABYLONIAN TOWN

To the south-west of the Larsa site, Neo-Babylonian remains were found tolerably well preserved immediately below the surface, and a considerable area was cleared in the course of the last few days of the season, enough to show the character of the town in the late period. There had been a complete change since the Larsa period and, indeed, since the Kassite period, so far

as the ruins of the latter enabled us to form a judgment. The older ruins had been swept away and the town rebuilt on an entirely new plan. It was laid out with broad avenues intersected by narrower streets at right angles. The houses, while preserving some of the features of the old buildings, were much larger and more sprawling, apparently only one storey high, and constructed wholly of mud brick without the burnt-brick foundation invariable in the Larsa age. One would gather that the population was much smaller and could therefore afford more elbow-room, and poorer in that it employed less expensive materials and avoided the use of upper rooms which would demand stouter beams for their construction — the price of wood was probably a serious consideration. On the other hand, the appearance of a deliberate scheme of town-planning would imply a municipal government possessed of a definite policy and autocratic powers, and this is further suggested by the uniformity in the style as well as in the arrangement of the buildings. Nearly always the outer face of a house wall is either broken up into a number of small and unmeaning buttresses or is resolved into a series of small saw-tooth angles; in the latter case the footings of the wall run in a straight line between its two extreme points, but at ground level the bricks will be laid askew with a right-angled set-back about twenty centimetres deep at every one-and-a-half or two metres so that the face of the wall is broken up into narrow vertical bands of light and shadow. Precisely the same method is employed in the walls of Bel-shalti-nannar's palace, and it is also a standing feature of the private houses at Babylon excavated by Koldewey; at Ur it was so far enforced that houses originally plain and not orientated strictly to the gridiron system of the new town have been re-faced with such decorated walls running at angles regardless of the lie of the interior. The alteration in these remodelled houses and therefore the inauguration of the new town-planning system and of the decoration of external walls can probably be dated with some exactness. Several small hoards of tablets were found which give two periods; the first are of Nabopolassar's time, the second are of Nebuchadnezzar's and continue through the Perisan period down to the twelfth year of Alexander the Great; the earlier hoards should belong to the houses irregularly built, the latter to the existing uniformly-aligned houses, and the change would be the work of Nebuchadnezzar; he had rebuilt Babylon, and his activities are so much in evidence in the public buildings at Ur that they might in any case be supposed to have extended to the private buildings also.

Our work done on the Neo-Babylonian site was confined to the close of the season and only two houses, each occupying the whole of a block, were completely excavated, while of others the outlines were traced; enough was done to secure the results described above, but to obtain a full idea of the late city much more is necessary; but it is impossible to say how far such

remains, hitherto encountered only on the highest of the mounds, survive. Further excavation would be well worth while, for apart from the interest of the town-planning and the house-types, the tablets found in these upper strata are good and numerous and the graves, especially those of the Persian period, contain small objects, such as seals and beads, which are most valuable material for studying the crafts of the time. The discovery this year of a tablet dated to the reign of Alexander is important, for the latest date hitherto forthcoming had been one of Artaxerxes II, and we had no evidence of the survival of the city into the Greek age. The only object shewing Greek influence at Ur was a terra-cotta found seven years ago near the Ziggurat; the tablet gives grounds for hoping that evidence may yet come to light to justify the identification of Ur with the unknown Kamarina of later writers.

THE HARBOUR TEMPLE

The Neo-Babylonian palace of which a description is given, in the next section of this report, by Mr. Mallowan, who was responsible for its excavation, lies close to and is structurally connected with the Harbour Temple. This building was excavated in the last few days of the season 1929-30 and an account of it was published in the *Antiquaries Journal*, and in the *Museum Journal*, Volume XXI, No. 2, page 84. It was professedly a preliminary account of a building which we had not had time to study properly; while the facts were stated correctly so far as they go, the conclusions then deduced from them must be modified.

The ground-plan, reproduced on Plate XLI, is fairly normal. I described how the plastered and whitewashed walls were found standing to a height of twenty feet and how, in the outer court, a feature constructed in burnt brick which by analogy with other temples should have been a table-of-offerings was in fact a screen standing as high as the outer walls, and how in the middle of the pro-naos what should have been an altar was a square column of burnt brick also as high as the walls and only to be explained as a support for the roof. I further remarked that the filling of the building for a depth of two metres or more was clean sand, and suggested that this was put in by Nabonidus to raise the floor above the damp.

The level of the Nabonidus floor can now be fixed, for a kind of causeway led from the palace to the north-west door of the temple, and the pavements were continuous; the causeway blocks the whole of the doorway as excavated and the floor was virtually at the present ground-level, that is, some four metres above the foundation of the walls to which our excavations went down. At no point under this, neither above nor below the clean sand filling, is there any trace of an earlier pavement. The truth is that the whole building excavated by us is the foundation of a building which has dis-

appeared; none of the walls which today seem to stand so high was ever meant to shew above-ground. All that survives of the temple is the "ush," that curious foundation which is described in a text of Gudea and was illustrated for us by Bur-Sin's temple to Nin-Gal: according to this ancient precedent the area destined for the temple was cleared and levelled and the walls were built to one third of the height planned for the building proper; then this was completely filled in with "clean earth" over which the floor was laid while the walls were built on the top of those which had been so deliberately buried. In the same way we can explain the features which were else anomalous; the "screen-wall" in the outer court is not a wall at all but the foundation of a table-of-offerings which would have stood only a few courses of bricks above the pavement of the real temple, and the brick "column" in the pronaos is the foundation of the normal low altar; what I had described as "pilasters" serving some unknown purpose are the foundations of just such low tables as we found against the walls of the shrines in Nebuchadnezzar's temple E-Nun-Mah.

But now a fresh point arises. I had suggested that the "pilasters" were cores for wooden panelling because of the extreme roughness of their construction; but the same roughness is evident in all the burnt-brick work: the lower courses may be fairly regular, but at a certain height (which is not the same in the different altars and tables) there is a break in the work, the next course projects and above this the face is carelessly irregular. In each case the lower part was built first as a finished unit and the upper brickwork is something different. Now the mud-brick walls, though they are only a foundation, were plastered and whitewashed. If we eliminate the rough upper part of the burnt-brick features, we are left with a complete temple duly equipped with its low brick altars and tables of offerings, its walls smooth and white, an exact prototype of the temple which was to rise above it. This, I think, is the real meaning of the "ush"; there was an underground temple filled in with clean earth and inaccessible to man (though presumably habitable by the god) and it was this which gave sanctity to the building above ground wherein man performs his service; the walls of the temple are based on those of the buried house of god, the altar on which the priest sacrifices derives its virtue from the fact that its brickwork goes down to rest on the altar in that house; in everything the seen is only a replica of the unseen, and its direct connection with that is what makes it holy.

EXCAVATIONS AT UR

THE PALACE BUILDING OF NABONIDUS

BY M. E. L. MALLOWAN

In November 1930 the Expedition uncovered a mud-brick building with abnormally deep foundations on the north-east side of the ancient harbour. This proved to be larger than any building yet discovered at Ur. Unlike any other building in Ur, its size and ground plan bear a striking resemblance to the huge palace at Babylon. The burnt brick of the pavement had stamps of Nabonidus referring to the building of the E-Gig-Par. Similar bricks had in previous season been found in the Neo-Babylonian restoration of E-Dublal-Mah where there was also evidence of a school and museum belonging to the king's daughter Bel-Shalti-Nannar, sister of Belshazzar. The absence of adequate housing accommodation therein is explained by the discovery of the palace building. Here we have a magnificent cloister designed to enhance the dignity of the king's vice-regent at a time when Babylon was in sore need of the ever-doubtful allegiance of its southern dependencies.

On excavation, the building was discovered to be for the most part ruined down to floor level, but the mud-brick walls had foundations over three metres below pavement level, and this enabled us to obtain a complete ground plan. The abnormal depth of foundation seems to have been due to the damp character of the soil, for the palace lay adjacent to the site of the now disused harbour. At the same time this use of deep foundations was in keeping with the ancient traditional 'ush' building¹ whereby the foundations were made one-third of the total height of the superstructure. Here also the foundations of the building were filled up solid with earth and rubbish, and a raised floor was thus erected high and dry over the low-lying and damp site. The "ush" method of construction, though not hitherto discovered at Ur in the Neo-Babylonian period, has an excellent parallel in the Ishtar gate at Babylon — yet another constructive link with the Kasr.

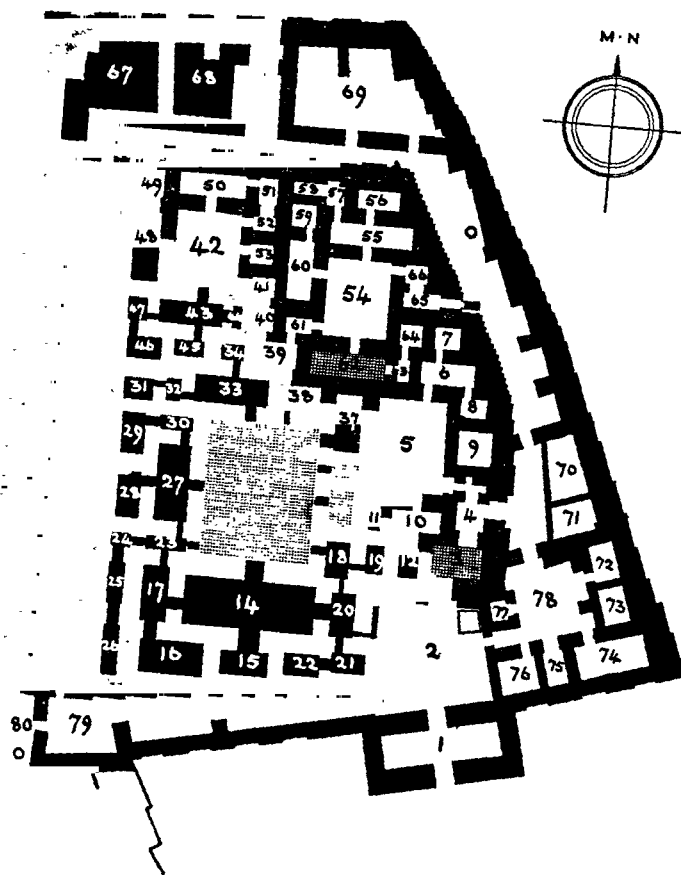
In area the site occupied by the buildings [Plate XXXI] is second only to that of the Kasr at Babylon. It is approached by a great square court or campus measuring 80 by 80 metres, and the palace itself has a maximum length of over 96 metres and a maximum breadth of 94.

¹ Foundations ran down 3.2 m. below pavement level. At 2.2 m. below the pavement there was a layer of matting. This was evidently the foundation of the "ush" proper. All the soil below it was damp and water-logged — the original surface into which the foundations of the wall had been dug. Above the matting rubbish had been thrown in, up to the level of the pavement. There was a considerable amount of burnt-brick rubbish and the interstices between the bricks proved that the rubbish had been deliberately thrown in at one time and was not gradual.

Where the foundations were excavated to their full depth it was seen that below pavement level the walls only had a very thin coat of plaster and had evidently never been exposed, whereas the plaster on the superstructure was often as much as 0.003 m. thick.

For the "ush" method of construction at Ur, cf. the "Gig-par-ku" and the Third Dynasty chambers of the great courtyard of the Nannar temple.

THE PALACE BUILDING OF NABONIDUS



SCALE OF METRES
0 20 40 60 80

MEL MALLOWAN
J. CRUIKSHANK ROSE ARIBA
MENS ET DELT 1930.

PLATE XXXI.—WOOLLEY: Excavations at Ur, 1930-31.

The main building has an axis that lies north by south. The different line taken by the east and south walls seems to be due to the existence of earlier buildings on the site of the ancient rampart which lay to the east of the palace.

The principal approach to the palace is from the courtyard on the south. It consists of a defensive wall pierced by a monumental gateway which gives access to a large courtyard.¹ This gave approach to a subsidiary house lying about court 78 at the south-east corner of the building, and to the core of the palace proper which contained no less than eighty chambers. This apparent maze of chambers, however, resolves itself into a series of units differing in size but similar in character. The units are clearly residential and consist of open courts surrounded by a series of chambers. The central complex is flanked by a passage surrounding all four sides of the building with subsidiary chambers radiating from it on three sides, and on the north side a smaller postern gate² matching the main pylon entrance on the south; the postern gate is flanked by three very large chambers, 67, 68, and 69, possibly magazines.

The nucleus of the building consists of four open courts, Nos. 13, 5, 42, and 54. The fifth court 2 is an annexe to the main residential quarters, and is also the central feature of a rather smaller house necessarily different in character from the other units of the building, owing to its accessibility from all sides. Courts 13, 42, and 54 are respectively the central features of residences, all of which are very similar. Court 13, which measures 17 by 15 metres, is the centre of the largest and most important house, presumably the dwelling of the high priestess herself. The similarity of ground plans is remarkable. Court 13 leads to a large oblong room 14, bearing all the characteristics of the Liwan or reception room, the largest in the house, with a wall on the court side thicker than the other party walls. This gives access to an inner private chamber 15. It will be observed that the arrangement of court, Liwan and inner chamber, 13, 14, and 15 of house 1, corresponds to 42, 43, and 45 of house 2, and to 54, 55, and 56 of house 3, and further, the subsidiary chambers from the Liwan repeat themselves in each case: 16, 17, and 20 in house 1; 46, 47, and 44 in house 2; with a slight modification in house 3, 57 and 58, due to the exigencies of space enforced by the line of the east wall. The arrangement of rooms on the side opposite to the Liwan in each of the three houses also has a curious correspondence: 33 leading to smaller subsidiary rooms 31 and 32 in house 1, 50 leading to 51 and 52 in

¹ Court 2 had a deep bitumen-lined tank in one corner by the north door. This conjunction of doorway and tank has previously been found outside the Temenos wall of Nebuchadnezzar.

² Under the pavement of the postern gate there were eight burnt-brick boxes containing painted mud Papsukal figures and the five sacred dogs, as well as a bronze dagger blade and an inscribed tablet unfortunately no longer decipherable. Three more boxes were also found in the entrance to room 4 and there were several other looted boxes under other doorways in the interior of the building.

house 2, 62 leading to 63 and 64 in house 3, while in houses 1 and 2 there is a single self-contained chamber on the east side of the court, 35 and 53 respectively. House 1, which has the greatest ground plan, is given four rooms, obviously magazines, 23 to 26.

Not only do these three most important residential units bear a close resemblance to one another, but they bear a further close resemblance to the eastern half of the great house at Merkes¹ discovered by Koldewey in Babylon. The great house in Merkes has exactly the same arrangement of court, Liwan and inner chamber; further, in the Ur building, 21 and 22, and the corresponding chambers in the other houses, find exact parallel in the Merkes house. As at Babylon, in the most important houses the Liwan lies on the southern side of the court, doubtless so situated as always to enjoy cool and shade.

Perhaps the most remarkable feature of the Ur palace is the extraordinary series of shallow-stepped buttresses running in a long receding line along the east side of the building. On the east wall alone there are over one hundred buttresses. Although the peculiar line of the east wall must be accounted for by the lie of older buildings outside, it is not at all clear for what reason the buttresses were taken out in so shallow a series. It was a common Babylonian practice to break the monotony of a long line of wall by the construction of niches and recesses, as, for example, in the Temenos wall, where the arrangement follows the dictates of strength and convenience as well as the tradition of an older timber-work construction. We cannot, however, find a constructional reason for this shallow form of buttress; but here again Babylon supplies a remarkable analogy. In the Nabo-polassar Palace there are eighty stepped buttresses over a length of 80 metres, and the same feature is to be observed on the south side of the principal court in the Kasr, as well as on three sides of the great house in Merkes. There are moreover further analogies from private houses discovered this season at Ur; and whatever the reason for its existence there is no doubt that this very characteristic feature of the outside of the building completely dominated the whole of the secular Babylonian architecture of the later Babylonian period.

The Ur building reveals this feature only on two sides, east and south. On the west, the flanking passage widens considerably, and on the inside of the outer boundary wall there is a system of piers running very nearly up to the end of the wall. These may have carried the springers for vaulted shelters, which could then be carried up solid, thus nearly doubling the thickness of the western boundary wall. On the other hand, the absence of these piers at the north end of the wall is difficult to account for on this hypothesis.

¹ See *Babylon* by Koldewey, translated by Johns, p. 288. It should be noticed, however that Koldewey surmises that the small room corresponding to Ur 15 may have been a shop and at Babylon this actually had an entrance opening into a street; neither fact is true of the Ur palace room.

No traces of roofing were discovered in the debris, but it seems obvious from the ground plan that the courts were open to the sky and served as light wells; at all events the large majority of the rooms would be roofed. There was a staircase leading to the roof or possibly to an upper floor in room 20 in house 1, and there may have been a staircase in room 58 in house 3. The staircase of room 65 in house 3 was subterranean, and seems to have been a temporary stair erected for the bricklayers during the time of construction. Analogies from Babylon and Ur for this period show that buildings were for the most part not more than one storey high, and the immense area covered by the ground plan tends also to show that this palace also must have been a single-storyed building.

It is interesting that there is a considerable discrepancy of levels in the great campus or court that formed the approach to the palace. The pavement level on the north-east side of the campus was indicated by a door socket found in position at the northern end of the boundary wall; and trial trenches revealed that the ground must have sloped gently from the north-east to the south-west, descending from the high-lying ground abutting on the ancient rampart to the low-lying harbour temple area. The foundations of the southern boundary wall of the great courtyard step downwards with the slope of the hill from north-east to south-west. In the southern wall there were a small pylon entrance which projected 1.5 metres from the line of the main wall. Owing to denudation, the southern corner had vanished, and only a very small strip of the western boundary wall was discovered. This enclosed the harbour temple, and by the west corner of the palace there was a very heavy double wall 15 metres thick from inner to outer face, possibly constructed to bridge the weakness in defence at the junction of the harbour temple and palace.

Seen from the south end of the campus the palace must have been an imposing spectacle, rising in a series of stages from the low-lying harbour temple to the high pylon gate, perhaps capped by the lofty walls of the great Liwan on the south side of court 13, where the enormous thickness of party wall seems designed for great height.

The close conjunction of pylon gate, palace, and temple again affords an analogy with Babylon with its conjunction of Ishtar Gate, Nimmach Temple, and Kasr.

By position as well as construction, the Ur building bears the stamp of a palace, for it lay outside the Temenos but sufficiently close to its walls to allow of immediate access, and was almost opposite the gates leading to the moon god's temple.

There seems little doubt from the numerous analogies already demonstrated that the architects of the Ur palace were basing themselves on a royal prototype in Babylon. It is also interesting that, although in many points

of construction the Ur building resembles the Kasr in Babylon, the more intimate features of the ground plan have a closer connexion with the great house of Merkes. This is in accordance with the supposition that the Ur building was the residence not of the king but of the king's daughter. The division of the palace into distinct units may perhaps correspond to the prominent class divisions in the orders of priestesses. But whatever the interpretation of the distinctive units may be, it is obvious that so large a building directly inspired by the capital itself must have come under the personal cognizance of the king.



FIGURE 1. -The Courtyard to Dungi's Building looking East to the doors of Rooms 1 and 3.

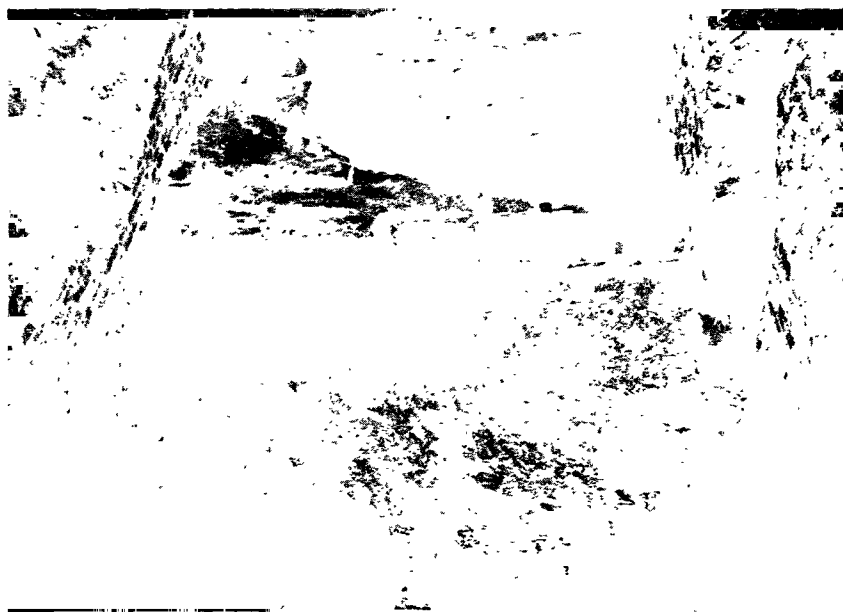


FIGURE 2. Room 5 in Dungi's Building, showing Grooved Altar.

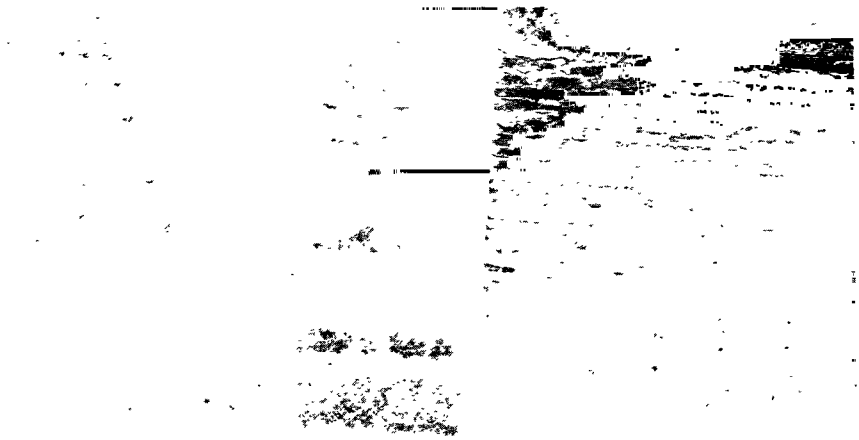


FIGURE 1. The Tomb-shaft of the Dungi Building looking down on to the Stairs. (The steps on the right, leading upwards, are the earth steps made by the workmen for clearing the shaft)



FIGURE 2. -Paternoster Row, looking along the street to the door of Bazaar Chapel.



View from inside the Tomb under Room 5 of the Dungi Building, looking up the stairs.



FIGURE 1. Pillar-base, panelled and whitewashed, from a Chapel (3) in House V, Niche Lane.



FIGURE 2.—Stove-hole of Furnace in Room 3 of House 1-B in Baker's Square.

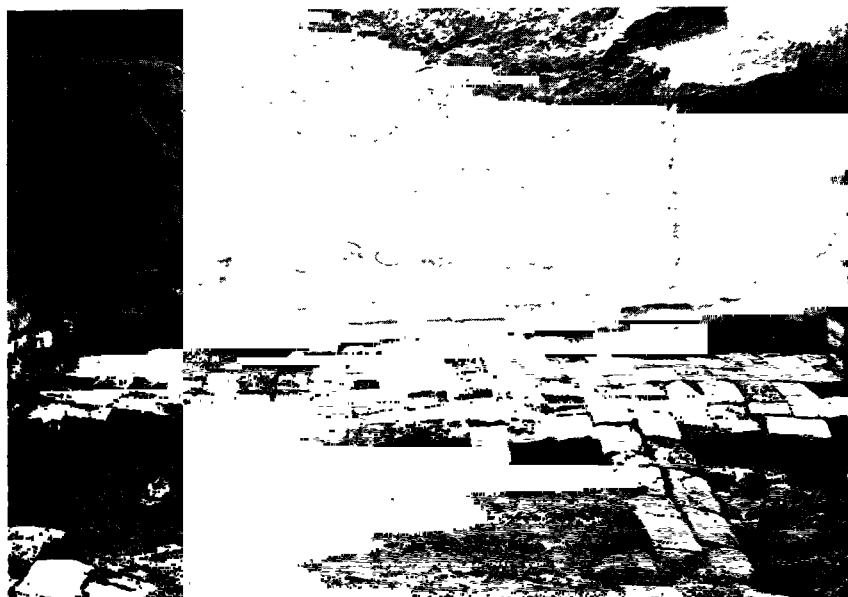


FIGURE 1. Room II in House I, Boundary Street. The Chapel Altar with clay bowls *in situ*, and the two decorated vases.



FIGURE 2. The Chapel in the School House (Number I in Broad Street), showing the Incense-burner.



FIGURE 1 — Pa-Sag Chapel seen from the street.

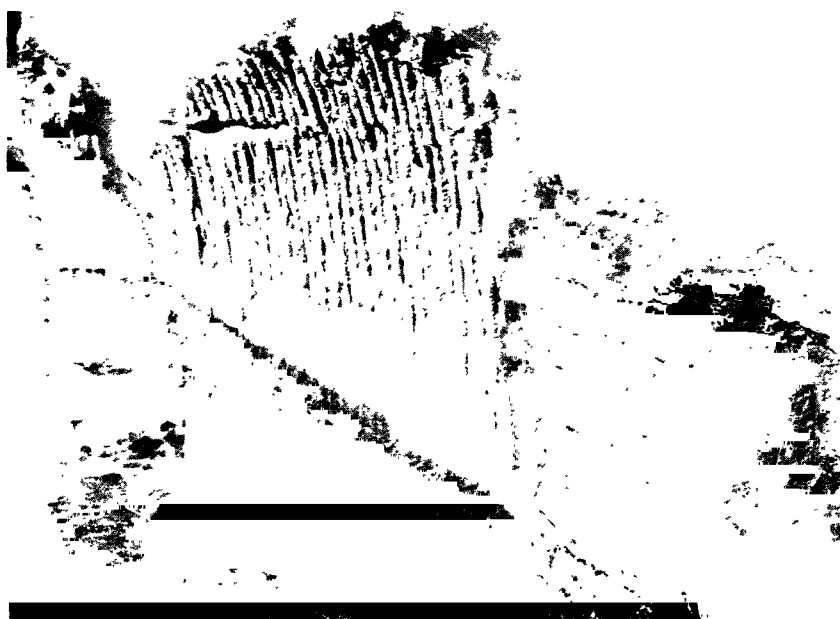


FIGURE 2 — Pa-Sag Chapel: the Sanctuary Door, showing impression in the earth of the wooden frame and reed panel.



FIGURE 1. Red-painted clay relief from the door of the Pa-Sag Chapel.

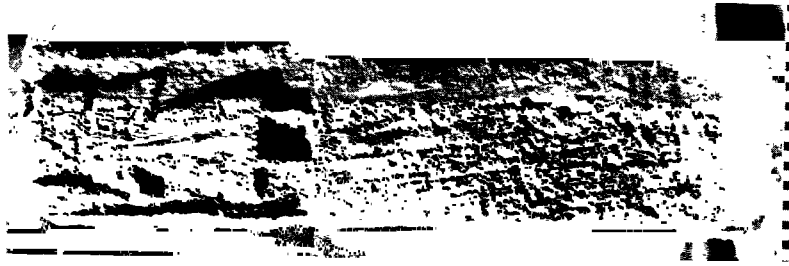


FIGURE 2. Carved limestone stoup (?) from the Pa-Sag Chapel.

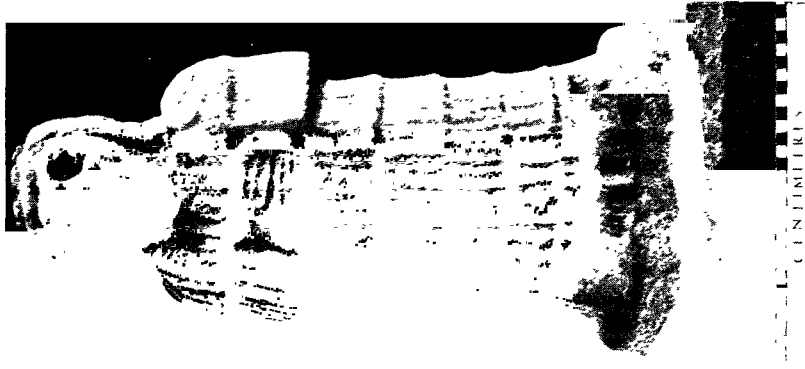


FIGURE 3. Limestone Statue from the Pa-Sag Chapel.

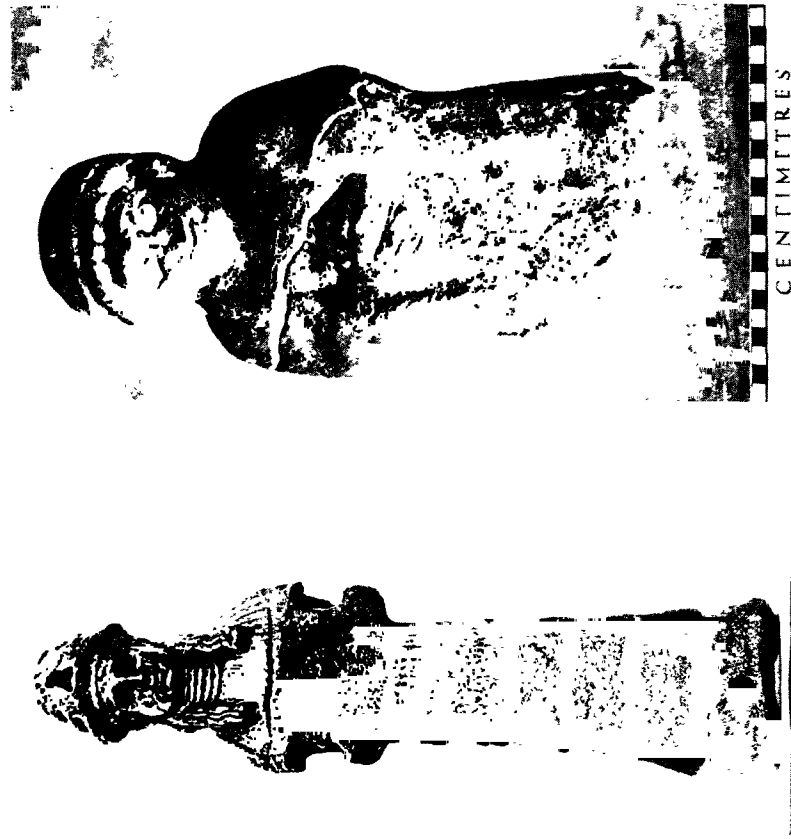


FIGURE 1. — Copper Statuette
from the Pa-Sag Chapel.



FIGURE 2. — Limestone Statue of Pa-Sag,
from the Chapel Sanctuary.

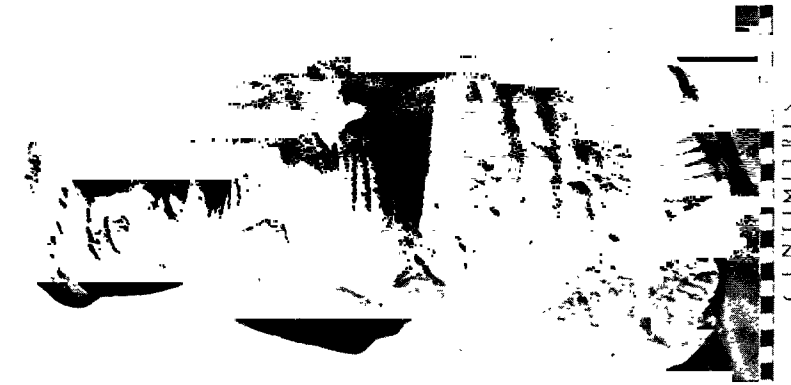


FIGURE 3. — Limestone Statue from
the Carfax Chapel.



FIGURE 1. Terra-Cotta relief of a goddess.



FIGURE 2. Steatite Ram's Head from the Ram Chapel.



FIGURE 3.— Fragment of a painted terra-cotta statue of a god.

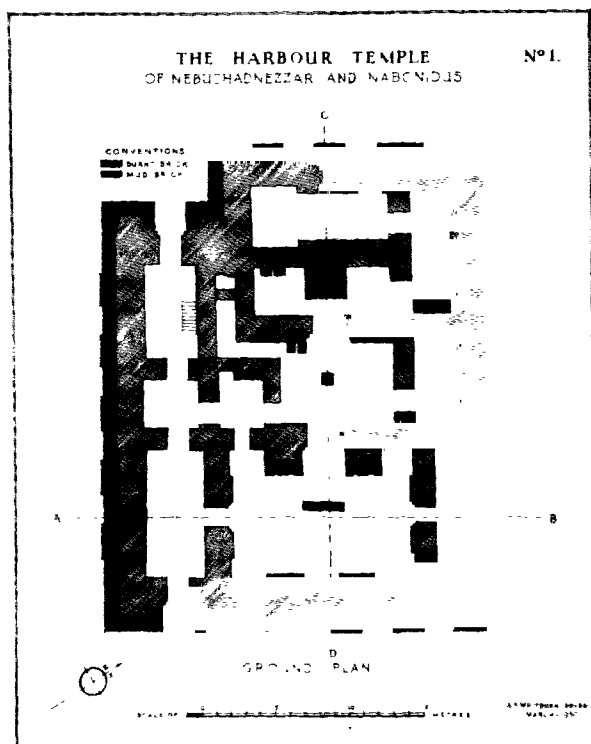


PLATE XLII.—WOOLLEY: Excavations at Ur, 1930-31.

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